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ABSTRACT

Summarizing three research projects, this report evaluates effects on students of secondary teachers' strikes in Ontario. The most important of the strikes examined is the stormy Metropolitan Toronto strike that stretched from November 12, 1975 to January 19, 1976. The studies were limited by the fact that they were begun after the strike was over and by lack of cooperation from teachers. The first study found no effect of strikes on student grades. The second study covered student attitudes toward teachers and the strike and found that of the substantial minority who reported the strike affected ability and motivation, most reported a negative effect. The third study reviewed data on dropouts from grades 9-13, interviewed dropouts, and concluded that strikes have impact on dropping out and on transitions to postsecondary education. Overall, the three studies suggest that strikes are most likely to have a negative effect on the academic learning of students in senior grades and in particular on learning in subjects like math and science where learning is cumulative. Although the studies did not focus on the effects of the strikes on teachers, informal contacts with teachers suggested that teachers after the strike were less idealistic about viewing teaching as a calling rather than a job. (Author/JM)

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# Abstract

This report is a summary of three research projects which focus on the effects on students of Ontario secondary school teachers' strikes. Most of the strikes whose effects are examined occurred in 1975/76; the most important of these was in the boards of Metro Toronto.

Chapter 1 of this report sketches the background to the research. It provides a brief history of the Metro Toronto strike, describes the history of the research project, and comments on the limitations on data gathering that were imposed on the three component projects. The second chapter summarizes the findings of the three component studies and follows closely the content of these studies, each of which is fully described in a separate report to the Ministry of Education.

While the three studies summarized are all concerned with the attempt to evaluate strike effects on students, each study focusses on a different aspect of this problem. *The Effects of Ontario Teachers' Strikes on Students--Student Achievement* (Mark Holmes) is an examination of secondary data on student marks and of information predicated on marks (graduation diplomas; Ontario scholarships). This study also discusses the usefulness of such data as a basis for inferences about real academic achievement and suggests that they are limited in this respect. The study concludes that a strike effect on student marks is not discernible in the data it examines.

*The Effects of Ontario Teachers' Strikes on the Attitudes and Perceptions of Grades 12 and 13 Students* (Michael Fullan and Glenn Eastabrook) analyses attitudinal data collected by questionnaire and interview techniques from a sample of students attending postsecondary institutions in 1976/77, most of whom had been in grade 13 during the strikes. This study had originally been planned to gather data in schools,

but for reasons beyond its control was unable to do so. It thus reports on perceptions students held one and in some cases two years after their strike experiences. It covers students' attitudes to teachers and to the strike, and includes the students' self-assessments of the impact the strikes had on them. Of the substantial minority who reported a strike impack on "ability and motivation" for postsecondary education, most claimed a negative effect. While the data from this study alone offer only a limited base for inferences about strike effects (the sample is restricted to a select group of high achievers attending postsecondary education and obtains *ex post facto* information), it achieved a very high response rate and obtained a wealth of responses to open-ended questions as well as information analysable in numerical terms. The findings of this study are most useful when compared with those from the third component study and are generally consistent with its conclusions.

The third study, *The Effects of Ontario Teachers' Strikes on Students: Effects on Student Flow, Dropout and Transitions* (Cicely Watson and Mohindra Gill), is primarily concerned with secondary data on movement in the education system. In addition, this study reports on interviews with dropouts and compares the characteristics of those who left in the strike year with those who left in the preceding and following years. The secondary data involve aggregate data on dropouts from grades 9 through 13 for both strike and no-strike boards and information taken from the application records of students who applied to postsecondary institutions. Comparisons between pre-strike, strike, and post-strike years and between strike boards and no-strike boards permit the isolation of changes which are idiosyncratic to strike boards in the strike year. This study concludes that there is strong evidence which suggests a strike impact both on dropping out and on transitions to postsecondary education.

The third section of this report attempts to provide a theoretical framework within which an overview and integration of the three component studies can be made. These theoretical arguments suggest that strikes are most likely to have a negative effect on the academic learning of students in senior grades and in particular of those in "hard" (math, science) subjects. It is argued that the knowledge taught in different school subjects varies in its internal structure, and that quite different rates of learning characterize different subjects and grade levels. The analysis then suggests that interruptions in schooling will have much greater impact on areas which are intensively taught and where learning is cumulative.

The component studies are then reviewed in this framework. Here we conclude that an interpretation of their main findings within this theoretical framework is plausible. The data from the component studies are thus consistent with a negative strike impact on student learning which was most marked in senior grades. Though the analysis of students marks does not demonstrate this impact (perhaps because teacher-assigned marks are not in this instance valid indications of any change), the remaining two studies suggest that the negative effect was more pronounced in math and science subjects. While this report thus concludes that the findings are given the most coherent interpretation within a framework that focusses on the strikes' negative impact on student learning, this conclusion is offered with caution. Since the data analysed are largely secondary or collected *ex post facto*, establishment of the way in which the strikes affected students must be done by interpreting and making inferences. Other interpretations of the same data might also be made, and choosing between competing interpretations is problematic given the limited nature of the data.

The study concludes by speculating on the aspect of the strikes that we still know least about--the impact on teachers and on the attitudes teachers hold toward their profession.

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# 1 Introduction

PART ONE: INTRODUCTION

This report is concerned with the summary and analysis of three component research projects on the effects of Ontario teachers' strikes on students. Most of the strikes which are the focus of the research occurred in 1975/76. The three component projects referred to, each of which is given an abbreviated title in the remainder of this report, are as follows: (1) Mark Holmes, *The Effects of Ontario Teachers' Strikes on Students--Student Achievement* (the Achievement component), (2) Michael Fullan and Glenn Eastabrook, *The Effects of Ontario Teachers' Strikes on the Attitudes and Perceptions of Grades 12 and 13 Students* (the Attitude component), and (3) Cicely Watson and Mohindra Gill, *The Effects of Ontario Teachers' Strikes on Students: Effects on Student Flow, Dropout and Transitions* (the Transitions component). All three studies were completed at the Ontario Institute for Studies in Education under a single contract from the Ministry of Education, Ontario.

Each of the component reports deals with only one aspect of the strike, and each has a different data base. The Attitude component, as its name implies, is concerned with the strike-related attitudes of a sample of students who attended postsecondary institutions after strikes in three selected school areas (Metro Toronto, Central Algoma, and Thunder Bay). The Transitions component examines dropout and transitions to postsecondary education in ten school boards which had strikes in 1975/76, and compares time-series data from these boards with time-series data from no-strike boards. The Achievement component looks at average school marks and awards contingent on marks (graduation diplomas and Ontario scholarships) in Metro Toronto boards for the four-year period up to and including 1975/76, the year of the strike in these boards.

Since each of the component studies deals with a different aspect of the strike, this fourth component is intended to summarize, integrate, and synthesize findings from the three research projects. No new data are introduced here, and an "in-depth" understanding of the whole research project and of conclusions arrived at in the component projects requires a reading of these individual reports. At the same time, a brief description of each of the three components is included below and conclusions are summarized or reproduced. Thus an overview of the whole research project is provided in this document. This introductory chapter describes the background to the research--a brief history of the strike in Metro Toronto in 1975/76, which was the starting point of the research project, a history of the research project itself, and a general analysis of its limitations. The second chapter is concerned with summarizing the main features of the three component studies. This involves a description of methodologies and findings. In this chapter, an attempt is made to adhere as closely as possible to the summary of the component studies. This is done by reproducing sections as they appear in the original components. In contrast, the third chapter attempts to provide an overview and integration of the component parts. This analysis goes beyond strict summary and seeks to provide a coherent overall theoretical framework and relate findings of component studies to this framework. Neither of these is attempted in full in the component studies. Finally, chapter 4 attempts briefly to draw out the policy implications from this Summary document and the three component studies.

## PART TWO: THE 1975/76 METRO TORONTO STRIKE: A BRIEF HISTORY

The point of origin for the three research reports summarized in this document was the strike of secondary school teachers of Metropolitan Toronto in 1975. In January of 1976, as the Toronto teachers were being legislated back to work, the then Minister of Education, the Honourable Thomas Wells, announced that his Ministry was to fund a major study to examine the strike's effects:

> We will examine the effects of the strike on students' academic progress and achievement, as well as effects on retention rates and entry of students into university and college. We will also try to assess how students' attitudes have been affected by the strike. The results should be of assistance to us all in helping guide future actions and directions in the whole area of collective bargaining in education.

In the process of creating and modifying the research design of

the study, we came to include examination of data on a number of other strikes; nevertheless, the Toronto strike provided our jumping-off point, and much of our data focus on it. In the light of this and the fact that the Toronto strike was the main focus of press coverage and public debate, we begin with a brief history of it. Concern here is to provide only a synopsis of the main events. A much more detailed analysis of the history of the strike is given in a recent study of the bargaining process completed by Professor John Kervin of the University of Toronto for the Education Relations Commission.[1]

The years preceding the Toronto strike year (1975) had seen growing militancy on the part of teachers in the province. This change in teacher attitude arose from a variety of sources. First, important centralizing changes occurred in the provincial organization of schools. In 1968/69 the 1400 boards of school trustees were reorganized into 77 boards of education and 49 Roman Catholic separate school boards.[2] A prevalent teacher attitude to the new centralized (and hence more remote) boards was negative, and a description of the Kirkland Lake strike, which began on 12 January 1976, reflects this.

> In justifying their stand, most of the teachers seem less concerned with salary or working conditions than with what they call "the attitude" of the local board. They point to deteriorating relationships with the board ever since the establishment of more centralized board structures in 1969--a deterioration that, in previous years, had already led to a couple of work-to-rule campaigns. "In the old days," one of them said, "we would settle it all over a cup of coffee; and standard practice was to offer us $400 more than the Toronto settlement." But their relationship with the present board they perceive as that of master and slave, with the elected board representatives more interested in personal power or political maneuvering than in education.[3]

A second important event was the provincial government's imposition of spending ceilings on the new boards in January 1971. For teachers the succeeding contract negotiations were given a negative tone by the ceilings. Indeed, the 1973 Metro contract was ratified by only 52% of Metro teachers, and those of the two largest boards--Toronto and North York--actually voted against.

In May 1973, 30 000 teachers participated in a demonstration at Queen's Park to protest the ceilings. In November of the same year there were mass resignations in support of salary demands. Strikes occurred in Windsor and York County. In 1974/75 there were strikes in Windsor, Thunder Bay, and Ottawa.

Third, there were important outside inputs to the way in which the

Ontario Secondary School Teachers' Federation (OSSTF) approached negotiations. Lessons learned from the American Teachers' Federation and from the teachers' Quebec counterparts gave a new coherence to OSSTF negotiating procedures, and the centralization of bargaining created by the reorganization of boards had similar results. Even in relatively small-scale local negotiations such as those preceding the Kirkland Lake strike, teacher-negotiators from the OSSTF were available to assist in bargaining and local teacher members of negotiating teams attended OSSTF-organized courses in collective bargaining tactics.[4]

Finally, inflation continued through what teachers viewed as the lean years after ceilings were imposed; salaries were eroded, and the possibility of wage legislation (it became a reality with the creation of the AIB in the middle of contract negotiations on 13 October 1975) created teacher pressure for a "catch-up" salary settlement.

The negotiations on which the Metro teachers embarked in February 1975 were to be long and bitter. Preliminary discussions between teacher representatives and the board began in January 1975, with the teachers' initial complete proposal being presented some three months later at the end of April. Impasse was quickly reached, and at the initiative of the board and with teacher assent mediation was agreed to in early June. A week later the appointment of Mr. Stanley Hartt as mediator was announced. While Hartt succeeded in the period that followed in achieving agreement between the two parties on a substantial number of non-monetary issues, disagreement in the area of salary remained.[5]

During the period of Hartt's mediation, Bill 100 ("An Act Respecting the Negotiation of Collective Agreements between School Boards and Teachers") became law. The Bill formed an important background to what followed, since it both formally legalized the teachers' right to strike and set out a framework within which subsequent negotiations were to be conducted. Important provisions included the use of a "fact finder" in disputes and the establishment of the Education Relations Commission (ERC), a neutral body to act as a referee in disputes.

Under the terms of the new Bill, and with negotiations deadlocked, Hartt was appointed "fact finder" by the ERC on 2 September. His report, submitted to the ERC and negotiating parties one month later and made public on 15 September, recommended a settlement substantially in line with the teachers' proposal. While, according to Kervin, there were signs that agreement would have been reached on the Fact Finder's Report,[6]

the imposition of wage and price controls by the federal government acted to change substantially the behaviour of the negotiating parties.

Despite a strong suggestion from the federal Minister of Finance, Donald MacDonald, that negotiators arrive at agreement before midnight of 13 October (the elementary school teachers in fact negotiated an agreement just within this time frame), the anti-inflation legislation was announced without a settlement of the Metro secondary school dispute having been achieved. The legislation had both a short-run and a long-run impact on the contract negotiations. The short-run impact was to further harden the attitudes of the board negotiators. While the report of the fact finder was used by the teachers to justify their position, the legislated scale of wage and salary increases embodied in the anti-inflation legislation (8-12%) was viewed by the board negotiators as legitimizing their opposition to OSSTF contract demands. Thus both sides had available "independent" judgments with which to counter the opposing position. The long-run impact of the legislation was, of course, to provide a settlement of the dispute within the guidelines of the AIB legislation and hence to force the teachers to return to work on terms worse than those offered by the board. While this was ultimately what occurred, the application of the anti-inflation legislation to the Metro teachers' contract negotiations was, in the month that followed the October impasse, ambiguous. The school boards sought clarification, and it was not until 28 November 1975 that the Anti-Inflation Board ruled that Metro teachers were bound by federal wage controls and that the board's offer exceeded the guidelines. The final application of decisions of the AIB was to come four months later, when a settlement achieved only by special legislation and compulsory arbitration was rolled back by the AIB.

By the time of the AIB's first ruling at the end of November, however, the OSSTF had on 6 November served notice of strike as required by Bill 100, and on 12 November the strike against all the boards in Metropolitan Toronto began. Support for the strike was strong: 92.8% of the teachers voted to reject the last offer before the strike vote, and 89% voted to strike. Although principals and vice-principals were forbidden to strike by Bill 100, they agreed to contribute up to 60% of their pay to support striking teachers.

Despite cuts in strike pay (from 40% of regular salary at the beginning of the strike to 20% on 15 December and then to $15 per day in January) this support remained strong. At the beginning of December a team

of mediators was agreed on with the assistance of the Education Relations Commission. The teachers agreed to submit a revised proposal from the board to their members for a vote. This proposal, distributed to teachers on 5 January 1976 and (according to the *Globe and Mail* report of 6 January) containing average salary increases of 24.6% in one year, was defeated three to one on 7 January.

An end to the conflict came not as a result of the protracted collective bargaining process commenced almost a year earlier, but as a result of provincial government action. On 10 January an ERC hearing on the effect of the strike on students' academic year took place, and on 15 January the Ontario Legislature began discussion of Bill 1, "An Act Respecting the Metropolitan Toronto Boards of Education and Teachers' Disputes." It legislated teachers back to work under threat of fines of $500 per day, cancelled remaining professional development days, and forbade work-to-rule. An appointed arbitrator was to set salaries. The Bill received Royal Assent on 16 January, and the teachers returned to work three days later. Mr. Justice C. L. Dubin of the Ontario Court of Appeal was appointed arbitrator of the dispute.

It was not, however, Mr. Justice Dubin who was to have final say on the matter of teachers' salaries. On 13 January 1976 the provincial government had entered into an agreement with the federal government which made the anti-inflation legislation and its regulations applicable to the provincial public sector retroactive to October 1975. Although the retroactive legislation was actually in response to a different challenge--this time from Renfrew teachers--it was therefore the AIB who had final say on the matter of teacher salaries in Metro. Mr. Justice Dubin awarded the teachers the board's final offer, the one they had rejected in November. In March 1976 the AIB rolled back the award approximately 4%.

No outline of the events surrounding the strike can adequately convey the depth of feelings that the strike aroused both among those directly involved and among the general public. Kervin in his study of the negotiating process locates a number of factors which tended to reduce the productivity of the negotiations and "harden" the positions of the negotiators. They include the relative bargaining inexperience of both sides, the scope of the negotiations (which for the first time included conditions of work and were for the first time conducted on a Metro-wide basis), the teachers' overwhelming support for their negotiators, and political ambitions on the part of trustees responding to what they saw as massive public opposition to the teachers' demands.

Of considerable importance too was the impact of the negative press reporting of the strike. A study by the Bureau of Municipal Research summarized its findings in this area as follows:

A systematic survey of the reportage and editorial and columnist opinion in the printed press together with the news reports on CBC and CTV television for the period October, 1975 to January 20, 1976 revealed the following:

1. the pattern of editorial and columnist opinion was uniformly hostile towards the teachers
2. the unflattering cumulative portrait of the teachers painted by this segment of the press stressed five characteristics: that teachers were
   a) indifferent and uncaring towards their students
   b) greedy and irresponsible
   c) lazy and spoiled by a "soft" job
   d) weak, complaining and petulant
   e) sheepish and boss-led by more militant leaders
3. on the essential wage and benefits issues themselves, the net effect of the daily reportage as opposed to commentary and opinion was superficial, confusing and at times misleading; news reports, however, were generally balanced, not slanted towards either side. On the matter of whose figures were used, those from both sides were.

   For the public trying to understand the dispute, the reports were undoubtedly confusing. For example, by comparing teachers' figures directly with those of the School Board, the gap seemed small--certainly resolvable by compromise. In defence of the reporters, both sides were using different figures, different bases of calculation or speaking two different languages, as a *Star* senior editor put it.

What the media failed to do was to provide a comprehensive overview of the issues. The media failed to coherently organize the facts and issues in a manner that the claims of both parties could be clearly understood. Related information, such as how other provinces were dealing with the AIB and collective bargaining with their provincial employees, or details of teacher wage levels in other Ontario cities relative to cost of living, etc., were not incorporated into news reports in an informative way. For an issue that absorbed such a vast amount of media attention, insight pieces or in-depth (one-two page) background reports were noticeably lacking.[7]

The media reporting of the strike itself affected the way in which at least some teachers oriented to the strike, and these orientations emerged in our subsequent discussions with them. Whatever the relationship between the reporting of the strike and public sentiment about it--whether the press coverage simply reflected a prevailing mood of opposition to teachers or, all or in part, created it--teachers *perceived* that they had little support. They were likened to other unionized public-sector employees, and claims which to them were just were made to seem unreasonable,

simply part of a prevailing trend to "inflated" wage claims by public-sector employees. The public hostility that the press conveyed eroded the teachers' confidence that their case would be fairly presented, and yet paradoxically created a "do-or-die" morale. There was as the strike progressed, at least among a section of the teachers, the feeling that if teachers were viewed in negative and hostile terms, then the only salvageable item was salary. If the public no longer held teachers in esteem, nothing further could be lost by holding fast on wage claims.

While the research reported here has no data bearing on this, it is our impression from informal contacts with teachers that--again at least with some teachers--the strike left a lasting impression in this way. Some teachers continued to feel betrayed long after the strike. Indeed, our inability to investigate the effects of a strike on teachers left an important gap in this research, one which we regretted considerably. A dispassionate analysis of teacher views of past strikes and their impact is surely the item most lacking from continuing discussions in this area.

In addition to the effect on the teachers themselves, considerable public misunderstanding of important issues followed from the media coverage of the strike. For example, a persistent dispute through the course of the the strike centred on the base on which percentage increases in salary were to be calculated. While the board emphasized the overall percentage increase in total teacher salaries, teachers emphasized percentage increases of positions in the salary grid.

> These and other differences in costing procedures led to some startling disparities. For example [in] the Fact Finder's Report [salary increases were] costed by its author, Hartt, at 39% while the Board reported the cost to be in the neighbourhood of 64%. The argument over costing remained throughout the dispute, even to the point of discussion in the arbitration decision.[8]

The generally negative media reporting and the public hostility to teachers were later to come to form an important part of the background to this research. Teachers feared that any of the studies' findings might simply afford the press another opportunity to editorialize negatively against them. These feelings were important in creating OSSTF opposition to the studies, and our failure to obtain teacher cooperation necessitated considerable modification of our data base.

## PART THREE: EFFECTS ON STUDENTS: RESEARCH BACKGROUND

When our study of the Ontario teachers' strikes began, our primary interest

lay in examining the impact of the strikes on both students and teachers. While there had been much speculation, the real effects of the strikes were not known. Not only were the effects of the various strikes which had occurred within the province of Ontario not understood, but a review of the research literature dealing with strikes elsewhere revealed that little was known generally about strike impacts on either teachers or students.[9] There was little by way of comparative literature from which inferences could be made to the local situation.

In the light of these factors, we had planned a research project which was to have been extensive both in the scope of the information it sought and in the size and range of sources from which data were to have been collected. We had planned three foci, and three relatively independent research undertakings. These were: (1) a look at the strikes' effects on student achievement (Achievement component), (2) an examination of attitudinal-perceptual changes occurring around the strikes (the Attitude component), and (3) the analysis of the strikes' effects on student flow in the education system, that is, on transitions between levels in education (the Transitions component). With the exception of the Transitions component, which retained the original research design, the study we originally embarked on was to experience substantial modification.

The Attitude portion of the research was to have looked at ways in which the views of students, teachers, parents, administrators, trustees, and the general public were affected by the strike. The data base planned for this section of the study was to have involved a random sample of thirteen schools from all of the six Metro boards. Within these schools, a 10% sample of students from all grade levels were to have been questioned as well as a 10% sample of parents, twenty randomly selected teachers, all principals and vice-principals, some central administrators, and a random sample of trustees.

The Achievement component of the study was to have looked at obtainable secondary data on student marks and graduation diplomas and was to have replicated a portion of the Interface study using previous Interface information as baseline data for assessing changes in achievement.[10]

The Transitions portion of the study was an outgrowth of an ongoing research project on student flow in education in Ontario.[11] Since its data sources were annual reports and postsecondary applications data, which required little special collection, it was not affected by the problems

that we experienced in gaining access to adequate information for the other two components. It had some pre-existing time-series information with which data on strike years could be compared, data on some strike-affected boards from previous research, and valid and reliable information on the changes it sought to measure.

The breadth and scope of this three-part research attempt were considered important for a number of reasons. First, the absence of good information on strike impacts, either for the Ontario teacher stoppages or those which had occurred elsewhere, suggested the need for a broadly based data-gathering effort which might allow subsequent researchers to focus more narrowly on areas we identified. The fact that little was known of any effect suggested that we look at as many potential effects as possible. Second, the methodological problems associated with what was inevitably an *ex post facto* research design suggested the collection and comparison of information from a variety of sources. (General methodological problems are reviewed below in this chapter, and additional comments are provided in the summaries of each of the three individual research reports.) We were more likely to be able to specify changes occurring around the strikes if we could locate these "effects" in data from different sources. We would also have a greater basis for causal inferences if comparisons between different data sources could be made. Finally, the widespread negativity toward teachers suggested the need for a dispassionate and extensive examination.

A broad-ranging analysis was, however, an objective which was to elude us. We were unable to obtain access to secondary school students for primary data gathering. As a consequence, in two portions of the study--the Attitude and Achievement sections--we were left with a data base which was far from adequate and which could not support the kinds of analyses we had hoped to make. For the Attitude study we were unable to gain teacher cooperation. Once this problem became evident, we had to abandon a large portion of the data gathering. While we were able to gather some data firsthand, we were not able to do so in any of the strike-affected schools; we had to rely exclusively on information collected from students in postsecondary institutions in 1976/77 who had been in high school during the strikes. Our inability to obtain access to Interface data or to replicate portions of this research was to have a similar weakening effect on the Achievement study.

Only after much preliminary work had been done did it become clear

that we would be unable to gather data in Metro Toronto schools. From the outset of the study we recognized that the cooperation of the teachers in gathering information for the study was essential. We also knew that teachers were embittered after a long and, for them, unsuccessful strike and were extremely sensitive to issues that we sought to probe. For this reason, we approached the executive of the Metro Toronto OSSTF to seek assistance in the form of teacher feedback on questionnaires and interview schedules and their approval for the overall study. Despite lengthy discussions, during which components of the research design were modified on the basis of suggestions from the Metro OSSTF, teacher cooperation with and approval of the study were not forthcoming.

The position of the Metro OSSTF executive in this matter was, perhaps, understandable. They felt that teachers had much to lose and little to gain from the kind of research undertaking we had proposed. In their view, should the study demonstrate that strikes had little or no effect on students, teachers would be portrayed as useless, irrelevant, or ineffective. On the other hand, were the study to demonstrate that strikes did have effects on students, the press would be given yet another opportunity to editorialize negatively against teachers. The OSSTF also pointed to the then recently let contract from the Education Relations Commission to John Kervin of the University of Toronto's Centre for Industrial Relations. He had received funding to study the negotiating process, and this research was perceived as adequately covering aspects of the strike which the OSSTF felt could be examined productively.

While we had considerable empathy for the teachers' position, their refusal to endorse our study seriously weakened it. Indeed, when the OSSTF's decision was made known to us, and it became evident that we would be unable to gather any primary data in the schools, we suggested to the contracting agency, the Ministry of Education, that we simply abandon the Attitude component of the study and all primary data gathering in this area. Considerable work had gone into questionnaire design and pretesting and into setting up the school sample; while abandoning the study would have meant writing all this off, the population of students we could access without teacher cooperation would clearly provide a very inadequate basis for assessment of the general impact of the strike. Our feeling was that such primary data would not yield a high return if we could not generalize our findings to the whole population of Metro strike-affected students. Without access to the schools this generalizability was impossible.

In consultation with Ministry of Education officials, however, we continued with the Attitude component of the study, using as our sample space a population of students in postsecondary institutions who had been exposed to the strikes. The number of strikes was increased--students from two northern boards which had experienced strikes were included--but the population range narrowed from *all* strike-affected students to *those who had gone on to postsecondary education* (and by inference had been relatively high achievers in secondary school). Findings from the Attitude study are reported in Part Two of chapter 2 below.

The Attitude portion of the research was not the only place where our efforts to obtain desirable data failed. We had hoped to be able to access Interface data and to replicate a portion of this study in order to allow pre- and post-strike comparisons on measures of student achievement. The decision by the Metro OSSTF not to sanction our study effectively blocked replication of any part of the Interface design by precluding access to the schools where replication would have been done. In addition, however, we could not use existing Interface data. Such data use would, it was felt by the Ministry of Education, have violated understandings concerning the purpose of the Interface study given at the time these data were collected. Thus, again, important potential sources of information were not available to us.

The overall impact of these setbacks was serious. They affected a research design already constrained by its commencing after the strike was over and being to a large extent limited to *ex post facto* measurement. The Attitude study was now limited to an extreme (postsecondary) and unrepresentative population. The Achievement portion could use only secondary data on teacher-assigned marks and awards of graduation diplomas, and these had dubious validity as measures of objective academic achievement. Only the Transitions portion of the research remained unaffected by the setbacks we had experienced.

We had originally hoped to remedy some of the deficiencies of the *ex post facto* design by comparisons of data drawn from different sources. For example, suppose we had discovered that students in the Attitude component of the study reported a lowering of performance that they perceived as a result of the strike. Suppose, too, that similar findings had shown up in the Achievement and Transitions portions of the study. We might reasonably have concluded that, though individual components of the study did not support a causal inference, the concurrence of all three

studies in this area did suggest a lowering of academic performance as a result of the strike. Whether the weakened design would permit this was now a matter of some doubt.

Because the design of the research was weaker than we had hoped, considerable effort was devoted to the development of a coherent theoretical framework within which findings could be interpreted and integrated. Since the data available are fragmentary, it is of added importance to generate systematic and coherent ideas for their interpretation. Though what we can say is limited by the research that we were able to do, some comparisons between the reports are possible, and an important analysis emerges through this process of comparison. Thus, the Transitions component suggests that the strikes' greatest impact was in grades 12 and 13. At the same time, its data on secondary school dropout and transitions to postsecondary education do not indicate the way in which the strikes created this effect. For example, was the strike-increased dropout, notable in senior grades, a consequence of an effect on motivation or of an effect directly on achievement?

Comparison with the Attitude component, whose data focus is on a sample of postsecondary students who had experienced strikes in their senior years in high school, permits a more detailed treatment of questions raised by the Transitions component. In particular this is facilitated by the wealth of student comment included in the returns of the Attitude questionnaire. The comparison between the two components is, then, useful even though the Attitude component has a restricted sample of students. Similarly, comments on the analysis generated by this comparison can also be made from the Achievement component, which analyses data on marks and mark-related awards (graduation diplomas; Ontario scholarships) for Metro in the four years up to and including the strike year 1975/76. From a research point of view, it is fortuitous that the greatest overlap between the studies occurs in exactly the location where the Transitions study (the component which provides the best overview of the grade-level locations of strike effects) suggests the impact to have been greatest--grades 12 and 13.

NOTES:

1. John B. Kervin, *A Report on the 1975 Metro Toronto Secondary Teacher-Board Negotiations and Strike* (Report #7704, Centre for Industrial Relations, University of Toronto, October 1977).

2. See Peter H. Hennessy, *Teacher Militancy: A Comparative Study of Ontario, Quebec and New York Teachers 1975* (Ottawa: Canadian Teachers' Federation, July 1975), pp. 9-10.

3. Hugh Oliver and Jane Hill, ". . . and better pay? An Informal Survey of the Kirkland Lake Teachers' Strike," *Orbit* 33, vol. 7, no. 3, June 1976.

4. Oliver and Hill, p. 21.

5. Kervin, p. 79.

6. Kervin, p. 79.

7. Charles K. Bens, Anne Golden, Glen Luff, and Lucy Paolucci, "The News Media and the Metro Toronto Teachers' Strike," *Comment #158*, Bureau of Municipal Research, Toronto, April 1976, pp. 5-6.

8. Kervin, p. 36.

9. See David Brison, *The Effects of Teachers' Strikes on Students: A Preliminary Annotated Bibliography* (Toronto: OISE, May 1976).

10. See Interface Project, *Secondary/Post-Secondary Interface Study* (Toronto: Ministry of Education, Ontario, 1977).

11. See Cicely Watson, *Focus on Dropouts* (Toronto: Ministry of Education, Ontario, 1977).

# 2 Summaries of Component Studies

This chapter contains three sections, each of which summarizes one of the component research projects. As noted above, the objective of this chapter is to provide summaries, while the chapter following (chapter 3) is concerned with the integration and synthesis of the findings. Part One of this chapter is a specially written summary of the Achievement component. Parts Two and Three are reproduced from the original Attitude and Transitions components with minor editorial revisions.

PART ONE: ACHIEVEMENT COMPONENT

*The Effects of Ontario Teachers' Strikes on Students: Student Achievement*--Mark Holmes

The Achievement component involved an analysis of secondary data on student marks and information predicated on these (graduation diplomas, Ontario scholarships, course credits) from eighteen selected boards. Also included were some theoretical ideas concerning relationships between time in school and achievement. Some of these ideas are incorporated in Part Two of chapter 3. The summary below focusses on methodological problems faced by the Achievement component and on its findings. Certain methodological problems are inherent in viewing marks as a measure of achievement, and we begin with a discussion of these problems.

The basic problems in assessing effects of strikes on achievement in Ontario centre on the lack of "baseline" data. In the United States standard achievement tests are taken by students in most high schools, and thus comparisons of achievement between students from different schools or different areas are consistently possible. In western Europe, although examinations are not, strictly speaking, standardized, they are administered externally under common conditions to the academically talented every year.

Other examinations are also commonly administered externally to students of lesser academic ability. Thus, while the pool of baseline data is somewhat inferior to that available in the United States, it nevertheless exists and can be used if appropriate caution is exercised.

In Canada, on the other hand, with the exception of Quebec, the provinces have virtually abandoned programs of extensive testing and examination, with the result that any research on achievement at the secondary level is severely handicapped.

In the light of this, we held no strong expectation that "objective" measures of achievement which would allow inter-school or inter-board comparisons would be available for strike and no-strike years. A search confirmed this. We were unable to find an example of a common achievement test of any kind being administered in two successive years at the secondary level within the Metro Toronto area. Although the search did not extend elsewhere, the researchers have no reason to believe that the situation is different elsewhere in the province. In other words, while comparisons can be made in terms of scores on the Canadian Test of Basic Skills, the Stanford test, and other written achievement tests at the elementary and junior-intermediate (senior public) levels, no such tests, as far as could be ascertained, are given in any of the high schools affected by recent strikes.

Nor did we meet with success in our attempts to obtain our own information. One outside agency does give tests in a single discipline to volunteers from secondary schools throughout the province. When asked to release the data (in an anonymous form such that no single school's name would be revealed), the agency declined to do so. It noted that the involvement of strike-affected schools was severely down anyway, and that the use of its statistics for the purpose of examining the strikes might violate a relation of trust with the teachers and lead them to discourage the future participation of their students.

A similar problem was encountered in our attempt to utilize Interface research achievement scores and replicate part of the study in 1977 for comparison purposes. However, our using the Interface data to study the strikes would have violated assurances given to teachers concerning the uses to which the data would be put, and we were thus unable to employ Interface material.

The study of effects of the strikes on student achievement thus had to be confined to secondary data predicated on student marks (mark

averages, graduation diplomas, proportions of Ontario scholars, and course credits). These data are in aggregate form. They refer, for example, to *numbers* of graduation diplomas and Ontario scholarships by board for a four-year period, and *numbers* of course credits in selected courses in Metro Toronto. With both graduation information and course credits, enrolment figures from the previous September are used to standardize the information and allow comparisons between boards and subjects in strike and no-strike years.

The use of these data, however, must be qualified. The data were supplied by the boards, and problems with the data are obvious. For example, in some years certain boards report the granting of a number of graduation diplomas greater than the number of students enrolled in the previous September. When enrolment data are used to standardize graduation information, some of the resulting figures thus exceed 100%. Furthermore, all of the information is derived from teacher-assigned marks, not from some independent measure of academic achievement.

The use of these teacher-assigned marks as a measure of achievement poses peculiar problems. First there is the problem of their comparability, a problem not only for researchers but also for college admissions departments trying to select students on the basis of grade 12 and 13 marks. Do the same marks from different high schools represent the same levels of academic performance? Do the same marks in different subjects indicate the same level of performance?

The problem of comparability arises from the way in which marks are assigned by teachers, and it is the part played by teachers that makes the acceptance of marks as indices of performance around a strike even more problematic. While it is clear that teachers do possess some shared understanding of the academic standards underlying mark assignment, it is also clear that the agreement is not absolute. Were there no agreement--no implicit standards shared by teachers--marks would not predict subsequent academic performance, something which, in populations of students, they do as well as standardized test scores. Were there complete agreement, mark distributions for "good" and "bad" schools would be notably different, while in fact they are similar. The sharing of marking standards among teachers is thus not complete, and any use of marks as a measure of achievement must recognize this element of variability and the role that the subjectivity of teachers plays in mark assignment.

These general problems are exacerbated by the specific situations

under consideration here--strikes. The use of student marks to measure the impact of a strike on student achievement is bound to be suspect because it is the teachers who have both assigned the marks and participated in the strike. Whereas under other circumstances we might suspend doubt as to the reliability and validity of teacher marks as measures of student performance, to do so in this situation is unacceptable methodologically. In a strike situation there is always the possibility that effects on student marks happen wholly or partially as a result of strike-related changes in the way in which teachers assign marks, and not directly because of changes in the achievement of the students themselves.

Indeed, as illustration of potential problems in this area, it is easy to generate a series of arguments by which marks after a strike could be related to changes in teachers' assignments of marks rather than changes in the performance of students. These arguments can be plausibly generated for increases in marks, for decreases, and for no change. For example, a drop in marks might be attributable to teachers' beliefs that achievement must be affected by time lost, whether or not it is. A rise in marks might be viewed as the attempt by teachers to ensure that students do not suffer for an event over which they have no control. No change in marks could result from unconscious scalings that make a given teacher's distributions of marks consistent from year to year independent of the shifts in actual pupil performance. Thus, without some direct information on how a strike changes teachers' marking behaviour, any inferences from student marks to objective levels of achievement are suspect.

All of our direct data on student academic achievement are based on teacher-assigned marks. Hence all of the problems described above exist in the data, and inferences from them must be qualified accordingly.

Despite the problems associated with making inferences from students' marks, it was nevertheless deemed important to include marks in this study, both for comparison purposes and for purposes of completeness. Where other portions of the study--the Attitude component, and the study of student flow--produce findings, it is important to know whether these findings show up in the patterns of marks achievement. In addition, it might be possible to detect changes in some highly specific technical subjects such as typing, where standards are likely more clearly defined, and compare these subjects with general skills subjects where standards are wholly teacher-established. Finally, even though student marks may not be interpretable here as indices of objective student achievement, students

are nevertheless "promoted" in education (for example, accepted to college) by marks. Thus any impact of the strike on marks (whether because of actual changes in achievement or because of shifts in teacher perceptions) would nevertheless have an impact on the careers of students.

The most important finding from the review of mark-related secondary data conducted within this study is that there was no perceptible change in *average* school marks for strike years for those schools we have examined.

Data were available to us for a sample selected to represent a wide range of schools (vocational and academic, inner-city and suburban) from all of Metropolitan Toronto with the exception of North York, whose board did not provide the data. The data covered a four-year period up to and including the school year of the Toronto strike (1975/76). Courses were chosen to represent a variety of grade levels and to include generalized skills such as English (which we would hypothesize to be less affected by loss of instructional time), as well as specific skills such as physics and typing (which we would expect to be more affected). Geography and history were deliberately excluded, because over this time period they increasingly became compulsory subjects and the kind of student represented in the courses thus changed.

Results of the analysis show no overall change in the marks in any subject. Similarly a closer analysis of data made available by the City of Toronto board for all subjects in all schools in the city shows the same result. There is no systematic change in the mark averages across the four-year period.

Similar results emerge in an examination of Ontario scholarships awarded in eighteen selected boards across the province. Ontario scholarships are granted to students with average marks of 80+ in their best six grade 13 subjects. While the data show considerable variability from year to year, there is no evidence to indicate that the number of Ontario scholarships awarded decreased in strike years in affected boards. Nor does the comparison with students from boards not affected by strikes suggest any strike impact on awards of Ontario scholarships. It seems reasonable to conclude that over the four years 1973-76, students did not fail to attain Ontario scholarships as a result of teachers' strikes.

The third data focus was on secondary school graduation diplomas, granted to students who have earned 27 credits. (Students are usually in grade 12 when they finish the diploma requirements, although they may be

in either grade 11 or grade 13.) Again we examined information from eighteen selected boards. While the percentage of diplomas awarded in 1976 (the most severe strike year) was lower overall, the decrease occurred in both strike and no-strike boards, and there is no consistent relationship between strike years and the proportions of students graduating.

Only in the fourth area in which data were examined was there any discernible change which might be strike-related. The percentage of students awarded honours graduation diplomas (granted on the successful completion of grade 13) tended to be lower in strike years. Data on honours graduation diplomas were available to us, and an analysis was made of graduates by sex and by board for the same four-year period, 1973-76. Females appear to have experienced consistently lower graduation rates in strike years. There were only three boards where the percentage of honours diplomas awarded to females in a strike year was higher than the average percentage in no-strike years. These exceptions tended to be boards with small enrolments. The data for males were less pronounced, with some of the larger boards reporting increased honours graduation in a strike year. Nevertheless, for eight out of twelve boards, the honours graduation percentage was lower in strike years than the average percentage in no-strike years.

Caution must, however, be exercised in interpreting this apparent decline in the proportion of honours diplomas awarded. First, there is the possibility that the enrolment figures used to generate the percentages are not valid. (Percentages of honours diplomas were calculated using grade 13 enrolments as the base figure.) Second, there is the possibility that even if the data do reflect a decline in honours graduation in strike years, this is a consequence of changes unrelated to the strikes. For example, Metro Toronto has experienced heavy immigration over the course of many years, with incoming students facing varying degrees of difficulty in adjusting to the school system. Thus declining proportions of honours diplomas in any year may wholly or in part reflect general school-population changes and not the effects of strikes. Thus caution must be exercised both in accepting the data on honours diplomas as reflecting an actual decline (they may be an artifact of spurious enrolment data) and in attributing this decline causally to the strike. At the same time, since the data on average marks do not show any change in strike years (and we are reasonably confident that these data do reflect actual school marks), any decline in honours graduation must be related to

increased dropout. For honours graduation to decline while average marks remained constant, students must either have dropped courses or dropped out entirely.

Other portions of this study, particularly the Transitions section, do demonstrate an increase in student dropout for strike years in grade 13, and the parallel suggests that the apparent decline in honours graduation is likely not a result of poor enrolment data but a real finding that reflects an increase in dropout. The fact that this increase in dropout does not show up in the re-examination of credit/enrolment ratios in the sample of eight Metro schools (reported below) we can only attribute to these eight schools' being in some way anomalous.

While the findings on honours graduation are similar to data from the other two portions of this research project, within the Achievement component itself they were relatively inconclusive. The magnitude of the differences is not large, and the data base suspect. Indeed, overall, the review of data on student marks and student awards based on them (graduation diplomas and Ontario scholarships) provided little evidence of changes which might have been strike-related. Average marks by subject showed no pattern of strike-related change. Neither did numbers of Ontario scholarships or ordinary graduation diplomas.

Subsequent to the writing of the final report of the Achievement study, an additional analysis was made of data on marks and credit/enrolment ratios for selected Year 5 subjects in a sample of eight Metro schools. Mark distributions were examined for a four-year period up to and including the strike year. Credit/enrolment ratios were available for the three-year period up to and including the strike year. This additional analysis was important in the light of the unexplained decline in honours graduation which the Achievement study noted, and in the light of findings from the other component studies, which suggested a negative impact on senior students, particularly those in "hard" (math, science) subjects.

Neither the analysis of mark distributions nor the analysis of dropout which can be inferred from the credit/enrolment ratios lends any support to these important findings from the other two component studies. The six subjects covered were chemistry, physics, biology, functions and relations, calculus, and English (geography and history being excluded for the reasons noted above). A total of 46 subjects-in-schools could thus be considered: five subjects in all eight schools in our Metro sample, and one subject (functions and relations, not taught in two of the schools)

in six schools. Overall credit/enrolment ratios do not appear to have changed markedly in the strike year; nor does there appear to have been any differential strike impact by subject. Thus, for example, calculus, which according to both the theoretical analysis set out below and the findings of the other two component studies might have been expected to be a locus of marked strike impact, underwent only a small decline in credit/enrolment ratios. Four out of the seven schools for which data on calculus were complete for all four years reported a decline, while three reported an increase. For chemistry four schools reported a decline, four an increase; these offset each other so as to show no impact on the average ratios. For English, a "soft" subject where less strike impact was to be expected, four schools reported an increase, four a decline; thus English was no different from chemistry in the strike year in this sample of eight schools.

Similar comments can be made for the distributions of marks. There appeared to be no consistent strike impact on marks in the strike year in comparison with the preceding three, nor any consistent impact by subject.

As we note below in out attempt to integrate findings from the three component studies, these data are inconsistent with some findings from the other studies. Nor do they throw any additional light on the finding from the Achievement study that honours graduation declined in the strike year.

All this may say little about objective student achievement. As we noted above, the absence of changes in student marks may mask real changes in levels of student knowledge. Marks, which are teacher-assigned, may not be a good way of assessing "objective" achievement around a strike, and about "objective" achievement we can make no sound inferences from the data available to us from this component study.

## PART TWO: ATTITUDE COMPONENT

*The Effects of Ontario Teachers' Strikes on the Attitudes and Perceptions of Grades 12 and 13 Students*--Michael Fullan and Glenn Eastabrook

As was noted in chapter 1, this component of the project was most handicapped by our inability to achieve teacher cooperation. When in September 1976 the Metro OSSTF opposed this study, plans for gathering data were abandoned so as to prevent the risk of further disruption in schools. Instead of collecting data from a range of different informants--students at different grade levels, parents, teachers, principals, vice-principals,

and trustees--we turned instead to an examination of the strike and of the related attitudes of a population accessible to us.

This population was composed of students attending postsecondary institutions in 1976/77 who had been in grades 12 and 13 during the strikes. Thus neither students who dropped out of school in these grades nor those who entered the work force instead of proceeding to higher education are included. The study did, however, ask students to report attitudes and behaviour that the respondents *believed* characterized parents, teachers, and other students. In addition it should be noted that the data are retrospective. Respondents were asked to report on attitudes and perceptions of strikes which had taken place one and, for a small number of students, two years earlier.

At the same time as the population sampled contains only some of those students in grades 12 and 13 during the strike, our basis for generalizing to those students who did continue to postsecondary education is a good one. The research was planned in two parts, each with a different data base. The first part was a questionnaire study of a sample of students who had been in school in the areas selected (Metro Toronto, Central Algoma, and Thunder Bay) during the strikes. These students were either in their first (Metro Toronto, Central Algoma) or second (Thunder Bay) year of postsecondary education. The strikes which were the focus of the study had occurred in Metro Toronto from 12 Novermber 1975 to 16 January 1976; in Central Algoma from 16 February 1976 to 12 April 1976; and at the Lakehead board from 26 November 1974 to 4 February 1975 (although this strike had been preceded by rotating strikes during October and November 1974 in the ten secondary schools in the system). With the strike in Central Algoma, as with the one in Metro Toronto, the teachers were legislated back to work.

The sampling frame included Ontario universities to which students from the three boards had applied, and community colleges in the three areas. Data collection involved both a large questionnaire study and a smaller interview study. For the universities the questionnaire sample was obtained from the Council of Ontario Universities' central list of admitted students. For Ryerson and the community colleges, where no central listing exists, we worked individually with each of the institutions to draw random samples from their files. The population contained 13 052 individuals. A 10% random sample of those from Metro secondary schools in 1975/76 received questionnaires. Because their numbers were small, all

of those from schools in Thunder Bay and Central Algoma in the relevant years were included in the sample. The return rate for the questionnaire study was 74%, a very high response rate for a study of this type. This yielded 1720 questionnaires, which included not only answers to fixed-response questions but a wealth of detailed written comments on open-ended questions. (There were over 10 000 of these statements, some 1000 for each open-ended question.)

The interview study had been planned to provide "in-depth" material to supplement the questionnaire study. It involved a sample of .06% from Metro and larger proportions from the other two locations. Again, the interview sample was selected randomly from lists, except in the case of Lakehead University, where local contacts were used because the list could not be obtained. Much of the necessity for the interview study was obviated by the unusually high response to the questionnaire component and by the detail of the written comments. Because findings from the interviews, given in chapter 5 of the Attitude component report, essentially parallel those of the questionnaires, they were not given detailed treatment.

The main findings for the study are in two parts. The first part contains both quantitative and qualitative (verbatim comments) responses to the strike. The second part is a subgroup analysis and concerns differential responses by the location of the strike, the institutions students were attending at the time of the study, their sex, their parents' occupation, and their mark average in high school. Responses to questions are grouped in four main categories:

1. Events and perceptions during the strike--an examination of what students did during the strike, both as to employment and as to school-related work.

2. Consequences for learning--a look at how students perceived the curriculum to have been changed; their response in terms of "catch-up" efforts; their concerns over graduating and being admitted to post-secondary institutions; and their perceptions of the impact of the strike on their ability and motivation for postsecondary education.

3. Consequences of the strike for attitudes toward teachers and toward strikes. Here we attempted to gauge the extent to which the students' response toward teachers was positive/negative immediately after the strike and at the time of the study; to look at student perceptions of the

attitudes of parents and friends as supportive of or opposed to teachers; and to examine views of teachers' right to strike. We also asked questions concerning bias in news reporting and preparation for future strikes.

4. General attitudes toward secondary school and this study. Here we asked more general questions about students' school experiences.

The main findings are summarized in the component study. The section following is reproduced with minor revisions from the final version of the Attitude component report.

*I. Summary of Findings*

*Overall Findings*

First, it can be said that almost half of the survey sample and over half of the interview sample did not do any school-related activities on a regular basis during the strike, and of the 56% who did, very few (19% of the total survey sample) found these activities to be helpful. About 25% of the survey sample said that they worked at a job for over 18 hours a week during the strike; 45% worked less than 6 hours per week, 14% from 6 to 12 hours, and 14% from 12 to 18 hours.

Second, a large majority of students in the survey sample (74%) said that parts of course curriculum were removed or eliminated when they returned from the strike. Only 15% reported that material was not removed. The remaining 11% did not know. Interview sample results were similar. There were two different perceptions of the consequences of this removal. One group of students stated that the removal was not harmful, because it consisted of non-core material or material irrelevant to their current postsecondary program. Another group felt that the removal of material was harmful to them; because they had missed or rushed over material, they felt that their marks or knowledge base had suffered. There is evidence on this point from the responses to open-ended questions (chapter 3 of the report of this component; analysis in chapter 4) according to the characteristics of those who felt the strike had most impact on their ability and motivation for postsecondary study: missed or rushed-over material was especially of concern in math and calculus, chemistry, and to a lesser extent English (where comments focussed on lack of training in grammar and essay writing).

Third, a majority of students (61%) in the survey and interview samples said that they made an extra effort in school after the strike

in order to make up for time lost. The remainder reported making little or no such effort. Many commented that a hectic pace was set in the attempt to cover all important course material.

Fourth, the analysis of whether students were worried about graduating, being admitted to postsecondary institutions, and keeping up at the postsecondary level identified what seemed to be two different subgroups. The proportion of students who in retrospect reported being worried "just after the strike" was almost half the survey sample. The remaining 52% reported very little or no worry. However, by the end of the school year about one-third of the sample continued to be worried, and the remaining two-thirds were not concerned about the impact of the strike on their subsequent performance.

Fifth, on the direct question of whether the strike had "affected ability or motivation to obtain an education beyond the secondary school level," 21% of the survey sample and 33% of the interview sample said yes. Most of these students who said yes claimed a negative impact and referred to one or more of the following: (i) lower grades, (ii) loss of study habits and an increase in laziness, (iii) lower desire to obtain further education, and (iv) loss of respect for teachers. The 79% who indicated no impact stated that they were independent and motivated enough that a strike would not affect them. About 3% of the survey sample said that the strike experience *increased* their motivation by making them more self-reliant. Students from both groups (those reporting effect and those reporting no effect) reported that many students dropped out of school as a result of the strike. However, we have no direct data on these students.

Sixth, students stated that they had more positive attitudes toward teachers before the strike than afterwards. The open-ended comments confirmed this in the students' own words. Approximately 15-20% of the survey sample reported a strike-caused loss of respect for teachers. These respondents thought that teachers were mainly concerned about money, had used the students as pawns, and were not concerned about the students' welfare. However, the majority of students (61%) in the survey sample said that teachers made an effort in the classroom after the strike to make up for time lost. When we asked directly whether teachers were helpful when they returned from the strike, 17% in the survey sample said that teachers were less helpful after the strike than before, 56% saw them as the same, and 27% thought they were more helpful. Comparable figures from the interview sample were, in order, 30%, 65%, and 5%.

Seventh, the majority of respondents in both the survey and interview samples (61%) stated that their parents were opposed to teachers during the strike. Only 13% in the survey study and 18% in the interview study said that their parents supported the teachers.

Eighth, 57% of the students in the survey sample did not think the teachers were justified in striking, and 43% thought they were; 45% said that teachers as a group should not have the right to strike, 37% thought they should have this right, and 19% answered "don't know." In the interview study 35% of the students said that teachers should not have the right to strike. Most students recognized that the question of the right to strike was very complicated. Those who thought teachers should not have the right to strike emphasized the damage that was done to students, who constituted an innocent third party to the dispute; those who took the opposing position emphasized the importance of the right to strike for all occupational groups. Those who answered "don't know" and provided comments tended to see both sides of the problem without being able to provide a resolution.

Ninth, 52% of the students in the survey sample who read newspapers regularly thought that the media coverage was biassed against the teachers. Most of these students came from the Metro Toronto area. Only 11% of this group thought coverage favoured the teachers, while 36% thought the coverage unbiassed. These responses came from 55% of the total sample. Some 42% did not pay attention to the news.

Tenth, 69% of the survey sample said that there is a need to have students better prepared for future strikes by (i) giving course outlines, (ii) making tutor sessions available, (iii) having schools foster the ability to study independently, and (iv) having meetings to inform students about the issues involved in the strike.

Eleventh, about one-third of the survey sample agreed with statements that high school did not meet their education requirements, did not prepare them for postsecondary schooling, and did not encourage students to think for themselves. The majority of students in both the survey and interview samples recommended that changes be made in the high school program to emphasize English grammar and other fundamentals, to prepare students for the transition from high school to university or college, to evaluate teachers, and to improve teacher/student relationships. These findings probably reflect general orientations to the interface between secondary and postsecondary education.

Twelfth, over 90% of the students in both samples expressed positive attitudes about the research study and the questions asked. They most often said that students' views on the strike were very important but had never been solicited before. They especially appreciated the opportunity to state their concerns even at this late date.

*Subgroup Findings (Survey Study)*

First, we found only two cases in which there were substantial differences among students as between the three strike locations, and these findings were not directly related to the impact of the strike on students. One finding was that parents of students in Metro Toronto were reported as being more opposed to teachers. The other was that more students from Metro Toronto thought that newspaper coverage of the strike was biassed against the teachers. It is also worth noting that none of the other responses about what the students did during the strike and how the strike affected them varied across the three strike locations.

Second, there were also only two differences involving comparisons of students in the four different types of postsecondary programs--university, Ryerson degree, Ryerson non-degree, and community college. Degree students (university and Ryerson) did more school-related work during the strike than others, and Ryerson non-degree students made less of an effort to make up for time lost and more often reported being affected by the strike. It should be remembered, however, that the total number of students in the Ryerson non-degree group is quite small (N=33).

Third, girls seem to have reacted to the strike differently from boys. A higher proportion of girls did school work during the strike, made an effort to make up for time lost, and were concerned about graduating. Perhaps as a consequence, a lower proportion of girls perceived an impact on their ability and motivation; however, this difference is too small to be significant.

Fourth, father's occupation and mother's occupation were measured in terms of six levels. We did find evidence that students whose parents were at the highest occupational level were less worried about the consequences of the strike and reported less of an impact. Parents at the next to highest occupational level seemed to be more opposed to the teachers and to their right to strike.

Fifth, mark average at the end of the high school year was correlated with several factors. The largest amount of school work was done by students

who attained highest marks (over 80), while the least amount was done by students who attained average marks (60-69). Those with lower marks were also more likely to have worked at a job for longer hours per week during the strike. Not surprisingly, students who ended up with lower marks reported that they were more worried after the strike about graduation, admission, and keeping up, and were affected by the strike to a greater degree. There was no relationship between mark average, perceptions of teachers, and attitudes toward strikes.

Sixth, students who were in postsecondary courses which required basic skills--math, science, or technology programs--were more likely to say that the strike affected them. For university students, the percentages of students in specific program areas who reported an impact on their ability and motivation for postsecondary education were as follows: philosophy/social sciences 16%, humanities 14%, math/sciences 24%, professional course (nursing, engineering) 18%. For Ryerson and the CAATs the percentages were: business 23%, arts 19%, community/health services 17%, and technology 32%. This pattern is further substantiated by comments made in response to open-ended questions. These comments placed emphasis on strike-related disruption in science subjects and particularly in mathematics. However, these students (who said they were affected by the strike) did not do any more (or less) school-related work during the strike or after the strike than did the students who reported not being affected.

Students who said they were affected by the strike were more likely to worry about graduation, admission to a postsecondary institution, and keeping up at the postsecondary level. A number of them did not complete that school year: some returned the following school year; others chose alternative postsecondary routes that did not require grade 13. Students who said they were affected were also more likely to view their teachers in negative terms, to feel that the teachers were not justified in striking, and to be against teachers' right to strike.

Seventh, and finally, the only subgroup relationships we found with the general attitudes toward secondary school were that those with lower mark averages and those who felt the strike affected them indicated that teacher/student relations were not as open at the high school and that the high school did not meet their educational requirements.

*II. Interpretation*

In order to discuss possible interpretations of the findings, it is

necessary to view the study in a larger context. We do not, for example, have longitudinal or comparative data which would allow us to examine perceptions of students before and after the strike, or to compare attitudes of students in strike situations with attitudes of those who didn't experience strikes. We cannot compare grade 12 and 13 students who went into the work force with those who went on to postsecondary education. In our survey sample we did obtain a very high response rate--74%--but we do not know the views of the 26% who did not return their questionnaires. Even if this group were somewhat different in their views, it would only alter the findings by a couple of percentage points, and we have no reason to believe that they would be different. All in all, we probably have a good representative sample of grade 12 and 13 students who went on to postsecondary work. The fact that the survey findings were mostly replicated by the interview sample, which was independently drawn, further confirms the quality of the data.

It should also be clear that our task was to gather information about the consequences of the strikes on the attitudes and perceptions of students. The starting point for this type of study is the fact that a strike has occurred.

Within the above parameters we are confident in drawing some conclusions based on the data. We do not have objective measures about academic performance or study habits, but there is little doubt that about 20% of the students in grade 12 and 13 *think* that the strike had a negative impact on either their marks or their motivation to learn. It is very probable that the strike did not affect students who were doing well academically (e.g., those with 80+ averages), and it may not have made any difference for those who were doing very poorly (e.g., those with marks in the 50s) and would probably have done poorly regardless. But it does seem that the strike had its greatest impact on the average and the borderline students (e.g., those in the 60-69 range and possibly lower). The exact mark ranges cannot be specified, but the pattern is probably as described. There were also indirect data--information from respondents' analyses of the behaviour of other students--which indicated that borderline and average students were more likely to drop out of school as a result of the strike; but students who dropped out are not in our research sample.

One can draw upon student open-ended comments to explore further the reasons for the relationships just discussed. Students who are doing

well academically do not seem to depend as much on teachers and school settings, at least for short periods of time such as the duration of a strike. Presumably they are more self-reliant and independent in their study habits and/or possibly have more family resources (e.g., parents who can help them) than other students. For example, students with higher marks did do more school work during the strike, and students with parents at the highest occupational level reported the lowest impact of the strike. Average and borderline students apparently need the help, direction, or pressure to keep at their school work which teachers and the school environment provide. Without this support or pressure they neglect school work and eventually either give up or become lazy and less motivated. It is impossible to decide within this study whether these students are using the strike as an excuse for poor performance or are experiencing negative effects.

We also have evidence from students which shows that those in the "hard" courses--math/calculus, chemistry, technology, and business--were more affected by the strike than students in other programs. Students in maths and sciences at university or community college said that the content and skills in those subjects in grade 12 and 13 were more directly needed in their postsecondary work, whereas students in other programs (social sciences, humanities, services) said that their postsecondary work was less directly reliant on their high school subjects. The comments on weaknesses in students' preparation in English also focussed on skills which were prerequisites for university courses--skills in grammar and essay writing.

Although most students said that individual teachers were helpful after the strike, the most consistent finding in this area concerned the 15-20% of the students who said that the greatest impact of the strike was their loss of respect for teachers. Clear and consistent reasons were given for what is perhaps a general disillusionment about teachers. Students saw teachers as being primarily concerned about money and their own welfare, and not at all concerned about the welfare of the students who were innocent parties to the disputes. They said that teacher/student relationships deteriorated as a result of the strike. Related to this concern, about half of the sample did not think that teacher strikes should be allowed, and many of those who would allow them stated that they should be used as a last resort because too many students are inadvertently harmed. Many of the students were also ambivalent as they

struggled with the pros and cons of the question. In any case, the actual strike seems to have either crystallized students' views about teacher strikes or served the function of politically socializing students by giving them firsthand experience with strikes.

It also should come as no surprise that the majority of parents were opposed to teacher strikes. It is interesting to note that parents in Metro Toronto were more strongly opposed and that newspaper coverage of the strike in Metro Toronto was seen as more biassed against the teachers. It is impossible to choose between the causal interpretations: were newspapers leading public opinion in a biassed way, as teachers have claimed, or were they reflecting public opinion?

Another important finding was that about one-third of the sample did not think that high school met their educational requirements or adequately prepared them for future education. There were remarkably consistent suggestions that English grammar was inadequately taught or not taught at all at high school and that its teaching needed to be improved drastically. Students thought that there needed to be more emphasis on independent study and on exams or other methods of preparing students for the independence of postsecondary education; that there was a need for better guidance counselling at high school; that high school teachers should be evaluated; and that teacher/student relations should be improved. Students also said that these issues were not related to the strikes. Responses show that a large minority of students have a clear idea of specific improvements that should be made in high school programs. It should be remembered, however, that these students represent grade 12 and 13 students who continued to postsecondary education. Students in other grades and students who went into the work force after grade 12 or 13 may have different views.

PART THREE: TRANSITIONS COMPONENT

*The Effects of Ontario Teachers' Strikes on Students: Effects on Student Flow, Dropout and Transitions*--Cicely Watson and Mohindra Gill

The Transitions component was planned as an analysis of time-series data on dropout, student flow, and transitions within the upper levels of the education system in Ontario--that is, secondary school flow and transitions to postsecondary education. Since it relied extensively on secondary data already available, it was unaffected by the problems that precluded primaty data gathering in the schools. Data used were from several sources.

The statistical records of the Ministry of Education, themselves compiled from principals' annual reports, were used to generate time-series data on enrolment and on numbers of graduates, Ontario scholars, and dropouts. These were calculated for the province as a whole and for each of ten individual boards which had experienced strikes in 1975/76. An eleventh school board which underwent a strike in this year (Kent County) was not included. The four boards in the sample from outside Metro Toronto and two of the six Metro boards had all participated in a large secondary school dropout study in 1974/75, the year preceding the strike. The fact that these data were already available reduced considerably the amount of data gathering that had to be done.

A second data source was the Ontario Universities' Applications Centre at Guelph. Data from this source came originally from applicants' forms and from registration reports of the universities. These permitted the tabulation of applications and registrations and the inclusion of the weighted average of applicants' grade 13 school marks. Parallel data for the CAATs were obtained from the Ministry of Colleges and Universities.

Finally, one portion of this research involved primary data gathering. Telephone interviews were conducted with a sample of students who dropped out of the ten boards of the strike sample in 1974/75, 1975/76, and 1976/77. The numbers of dropouts in each year who were interviewed were respectively 152, 716, and 626.

The analysis generated in this component study is arrived at by the comparison of time-series data. In general, ratios which use enrolment figures to standardize for different-size enrolments are calculated. Most of the data available permit the construction of three-year time series (pre-strike, strike, and post-strike years) for the individual strike boards, for the ten strike boards together, for the province as a whole, and for the boards which did not experience a strike in 1975/76. Occasionally, where information for 1976/77 was unavailable, the series are for two years only. This breakdown by board can be made both for the secondary school dropout data and for the colleges and universities transitions data. In addition, the dropout data can be broken down by grade level and by month of dropout.

Estimates of strike impact are formed by comparisons within and between time series. The time-series data for the individual boards and their aggregate data are used to isolate trends for the strike boards. These trends are then compared with those prevailing in no-strike boards.

These procedures facilitate the isolation of changes which are idiosyncratic to the strike year and potentially causally related to the strike itself. These idiosyncratic changes are isolated from (i) trends peculiar to strike boards which differ in systematic ways from other boards (for example, by being disproportionately Metro boards), and (ii) trends which are general changes. Thus, for example, during the period 1974-76 dropout rates in the province as a whole were increasing; and yet comparison of the strike boards with the overall trend shows a particularly marked increase in dropout for the strike year, an increase which is greater than that to be expected from dropout patterns in preceding and following years in the strike boards and from dropout patterns in no-strike boards.

The conclusions arrived at by this component report are listed numerically below. (The remaining portion of this summary of the Transitions component is reproduced with minor revisions from the concluding chapter of its report.) They were reached by examination of (i) dropout by grade level, month, year, and board, (ii) interview data from samples of dropouts in 1974/75, 1975/76, and 1976/77, (iii) applications to and actual registrations in the two types of postsecondary institutions by board and by year, (iv) grade 13 marks of these applicants by board and by year.

1. In the strike year, withdrawal (i.e., within-the-year dropout) rates significantly increased in all grades of the schools of the systems on strike. The highest increases were observed for grades 12 and 13. The statistics suggest that this development was not part of a general provincial trend. It was not shared by the rest of the province.

In the most common pattern in the strike boards, the number of dropouts rose in the strike year and then subsided. The subsidence was not always back to the level of the pre-strike year, and in some cases it was delayed. The patterns of changes in dropout rates have been grouped into four clear "categories" plus an "other." There is no question that the distribution of the patterns in the strike boards is statistically significant. The most common pattern (increase in the strike year followed by a decrease the next year) occurs much more frequently than can be accounted for by chance. Not all boards were equally affected, but most show this effect to a marked degree. The total sample of ten strike boards (very different in size, geographical location, and many other important characteristics) all show this effect. The evidence we have indicates that the rest of the province (combined no-strike boards) does not show this

effect. Indeed it cannot, because between the pre-strike and strike year the general dropout rate for the rest of the province (combined) and the rate for every grade except grade 13 dropped (and in that grade there was no change).

Since the ten dissimilar boards have only one characteristic in common--their secondary school teachers were on strike during 1975/76--and the increase their dropout rates showed in that year was quite counter to the trend in the rest of the province, we consider this *prima facie* evidence that the development was caused by the strike.

2. There is no evidence to suggest that the strike had an impact on the customary distribution of dropouts by sex.

3. On the other hand, there is some evidence that it may have had an impact on the customary dropout rates by grade--that the grade 13 dropout losses disproportionately rose. The pattern of change in the grade 13 loss was markedly different from the corresponding pattern for the no-strike boards, where there was no increase in dropout rate in the strike year. This differential impact, and the fact that it is grade 13 students who were adversely affected, accords with other evidence of the impact on grade 13.

4. There was a significant increase in the incidence of dropout in strike boards in the months following their strikes. In most cases this increase was of sufficient size to upset their common patterns of dropout-by-month. There is no evidence of a comparable shift in the pattern of dropout for the province in 1975/76, but since provincial dropout statistics are not reported as losses-by-month we cannot state unequivocally that only the strike boards experienced this change in the strike year. What can be said is the following:

-- The provincial pattern of monthly dropout has been well established by a series of OISE dropout studies which were carried out over the three years 1972/73-1974/75. It shows two "peaks"--generally in October and February.
-- In the pre-strike year the strike boards all exhibited patterns of loss by month which could be identified as variations on the general theme.
-- In the strike year all these patterns were disrupted such as to "pile up" the dropouts in the months following the strike.
-- The change was of such magnitude that it was exceedingly unlikely to have occurred by chance--that would be to stretch coincidence beyond credence.

In the discussion following the dramatic strike in Metropolitan Toronto, the claim was made that the effects of strikes are short-lived. It was suggested that the life of the school is disrupted and students are immediately affected, but that there is a quick return to normal once the strike is over. But even if this is true, students cannot "return to normal" *unless they are still in school.*

Even in the case of dropouts the effect is probably not of lasting importance, provided the student re-enters school the next academic year. However, the following comments can be made on this disclaimer of effect: (a) The OISE series of dropout studies show that students perceive a disruption of schooling (due to illness, transfer, family crisis) as a justifiable "reason" (or excuse) for leaving school and they offer it frequently--not as frequently as "to take a job" or "hate school" but sufficiently for it to be an identifiable category as a contributory cause. (b) There is considerable "slippage" between dropping out of school during one school year and going back the following fall. Many good intentions are not realized. (c) There is indirect evidence that only one system of our strike sample of ten really did recover most of its post-strike dropouts the following September. The indirect evidence is of two types--a historical analysis of the grade survival rates of the enrolment of the ten systems, and their historical record of re-entry rates. If any system had recovered an unusually large number of dropouts, this should have been visible in their 1976/77 enrolment. Such a re-entry seems to have occurred only in one case, where the 1976/77 enrolment increased beyond the level of 1975/76.

We do not have a historical file of all re-entries. However, for one of the systems of this sample, the dropout lists were provided by means of their admit/demit school computer printout lists. For this system we have three years of September re-entry figures, and there is no statistical evidence of an abnormally high re-entry rate in September of the post-strike year. All the strike boards were phoned, and only in the one system referred to above was there the impression, locally, that a massive re-entry recovery had taken place in September 1976.

The findings summarized in 1-4 above are based on data on dropout the source of which is school records. Items 5-10 below are conclusions drawn from interviews with dropouts. The sample included dropouts from each of the three years from six of the ten boards. The 1974/75 interview

responses with a 3% sample of the dropouts from 26 boards are used as a baseline for comparisons. Findings are as follows:

5. There was no significant change in the strike year in the parents' country of origin, employment/non-employment status, mothers' occupational status, family size, and experience of sibling dropouts. However, there was a significant change in the strike-year dropouts' fathers' occupational status--an increase in the proportion from the highest level (professional and managerial). This is congruent with the finding that the strike year seems to have disproportionately affected grade 13 and the students whose fathers had attained comparatively higher levels of education.

There was also a significant change in the strike year in the fathers' level of education--the numbers of dropouts whose fathers had (i) at least one year of secondary education or (ii) at least one year of postsecondary education increased disproportionately in the strike year.

There was also a significant change in the distribution of dropouts by family income--a decrease in the strike and post-strike years among the higher-income group. This finding seems to contradict findings related to the fathers' occupational and educational levels. However, the inconsistency could be due to the unreliable nature of the family-income data or to differences that "family income" rather than "father's income" may imply.

Our general conclusion, then, is that the family characteristics of the interview samples did not change sufficiently over those years to account for significant changes we might report in the dropouts' reasons for leaving school.

6. Economic reasons for leaving school decreased in importance, with a corresponding gain in importance of school-related and personal reasons for leaving. The teachers' strike was the most important single reason in the strike year. Although the introduction of an extra reason category ("strike") in the reasons for dropping out from school in the years 1975/76 and 1976/77 caused a reduction in the proportionate size of the more usual reason categories and some shifting in their rank order of importance, these changes were not of sufficient magnitude to be statistically significant.

7. The majority of dropouts were working when they were interviewed and males were overrepresented among those working. (Males were also overrepresented among those who returned to high school.)

An inverse relationship seems to exist between grade level and the percentage unemployed. In other words, there is an "almost unbroken" progression--the higher the grade left, the greater the proportion of its dropouts who are working. A shift in the distribution of destination categories occurred in the strike year, and in the following year the pattern more or less returned to its former state.

There was a noteworthy shift in the employment/unemployment pattern of dropouts over the three years. The percentage of unemployed dropouts was almost the same for the pre-strike (23.6%) and post-strike (24%) years but reduced in the strike year (to 17.9%).

The percentage of fully employed dropouts was highest in the strike year. This seems anomalous, as the employment conditions were unlikely to have changed. Employment is a function of labour market conditions, which were not drastically different in the strike year and certainly not likely to have been affected by the strike. However, it seems reasonable to assume that the "employability" of the dropouts changed in the strike year. This would be congruent with our findings that students of high socioeconomic status (as indicated by the fathers' occupational and educational attainments) were overrepresented among the strike-year dropouts. These students presumably have superior access to jobs by virtue of their fathers' direct control over employment opportunities (the fathers are "employers" in a loose sense) and through their fathers' network of contacts with other similar "employers." The result might have been more employment opportunities and probably better jobs for the high-status dropouts; low-status dropouts normally have to seek employment in an "open" market in competition with older and better-qualified people.

8. In the strike year the incidence of potential dropouts discussing their plans with their parents significantly increased. The increase was slightly greater for boys than for girls. In the pre-strike year there was a significantly greater degree of consultation by girls than by boys.

Students who reported that they had not discussed their school-leaving plans with their parents were asked, "Why not?" In a few cases the students maintained that their parents wanted them to leave or that the parents "didn't care"/"were indifferent." But in all three years the most common response category was "other"--the students described idiosyncratic and complicated family and other circumstances which made consultation difficult or undesirable. Reasons for not discussing school withdrawal with parents were significantly related to students' grade

level in the strike year. In other words, a shift did occur in the grade distribution of responses between 1974/75 and 1975/76, and the post-strike year saw a return to the pre-strike pattern. The dropouts reporting parents' being "indifferent" to their plans for leaving school were overrepresented among 11th and 12th graders in the strike year.

The most common response of parents to the students' raising the matter of leaving school is that the students are old enough to make their own decisions. While this was true in all years, relatively fewer parents were disappointed at their children's plans to leave school during the strike year (14.2%) in comparison with the other two years.

Parents' disapproval and disappointment at their children's dropping out of school seems to be lessening. Possibly parents are becoming resigned and, provided the children eventually return to school, now look upon dropping out merely as an episode of minor importance.

There was a significant relationship between students' explanations as to why they did not consult their parents before leaving school and their destination (those who resumed full-time study vs. the rest). In the pre-strike year, two-thirds of those studying full-time gave parental indifference as the reason for not discussing their plans, as compared to only 18.8% of the rest. In the next two years, this reason dwindled to zero among those studing full-time. The "other" reasons category gained accordingly.

9. More than half of the dropouts who had returned to school by the time of the interview expected to continue their education. This was true for dropouts in every year under study, but the majority was even larger among the strike-year dropouts. Males were overrepresented in the "further education" category in each year; females were consistently overrepresented among those planning to get jobs

Those dropouts who had not returned to full-time study by the time they were interviewed were for the most part working and had plans which involved their jobs. This was less true among the strike-year dropouts, of whom a sizeable group reported "other" education plans--that is, plans which did not involve the secondary school system. In what way these plans were a response to the strike situation we cannot be sure, but there is no doubt that they represent a rejection of the secondary school as a study milieu.

10. The interviewed sample of dropouts from the ten boards that experienced

a strike in 1975/76 divided fairly evenly as to whether the strike was justified. This was true among both the strike-year and the post-strike-year dropouts. However, a large majority of the former (78.7%) felt that the teachers should have returned to work sooner, and this proportion dropped only slightly among the latter. Again, the proportion who felt that the government ought to have intervened sooner was large in the former group (78.5%); it was slightly larger again in the latter group, but not significantly so.

The majority of interviewed strike-year dropouts felt that they did not support the teachers in the strike, whereas the majority of dropouts in the following year felt that they had been on the teachers' side. A shift in opinion had occurred of significant proportion. However, we cannot judge whether this *post hoc* reasoning of the 1976/77 dropouts is merely the more generous reaction of retrospect or a reflection of a different response of a group which stayed in school over the strike year and dropped out later. No serious opinion study was made of students of all school grades in the year of the strike, and the Attitude study which was part of this Ministry contract involved only grade 13 students who entered postsecondary institutions in a year following a strike.

The subsequent findings are concerned with the effects of the teachers' strikes on the normal academic transition of the grade 12 and grade 13 graduates who sought admission into institutions of postsecondary education in Ontario.

11. For the sample of ten strike boards as a whole, from the pre-strike to the strike year (i.e., from 1974/75 to 1975/76), there was a statistically significant decrease in the ratio of honours secondary school graduates to grade 13 enrolment. But then in the rest of the boards of the province (no-strike boards) there was also a statistically significant decrease in this ratio in the same year. Without a complete set of comparable figures to show graduations in all boards in 1976/77, we cannot say whether the pattern of change in the strike sample was atypical. However, on the basis of the data for the pre-strike and strike years, it seems that the reduction is a province-wide trend and that the marked decrease of 1975/76 in these boards was not unusual and was not a product of the strike.

12. For the sample of strike boards as a whole, in the year of the strike there was a substantially significant increase in the ratio of Ontario scholars (honours graduates with an average of 80+) to grade 13 graduates,

and there was no change in the ratio of scholars to grade 13 enrolment. There was also a significant increase in the (combined) boards of the rest of the province in the ratio of scholars to graduates. Thus the direction of change for the strike and no-strike boards was similar. There was a rise in the absolute number of scholars in the strike boards.

13. For the strike sample as a whole and for four of the boards in the sample the ratio of the number of university applicants to grade 13 enrolment decreased significantly in the strike year and decreased again in the post-strike year. For the no-strike boards as a whole there was no change in the ratio in the strike year; while there was a significant reduction in the year following the strike, it was of lesser magnitude than that for the strike boards. The ratios were .76, .72, .68 for the strike boards, and .73, .73, .71 for the no-strike boards. (The high pre-strike ratio in the strike boards, .76, reflects the preponderance of boards in Metro Toronto, where access to numerous postsecondary institutions has a demonstrable effect on aspirations.)

14. For the strike sample and for seven of the ten boards there was a decline in the ratio of university registrants to university applicants from 1974/75 to 1975/76. The decline was statistically significant for the sample as a whole and for two boards; for another board there was a statistically significant increase in the ratio that year. For the rest of Ontario the ratio increased significantly in the strike year but decreased significantly the next. For the strike sample, after the significant decrease of the strike year the ratio remained unchanged. The ratios were .72, .69, .69 (strike boards) and .73, .74, .72 (no-strike boards).

15. The next ratio we checked was that of university registrants to grade 13 enrolment. This reduced steadily for the three years for the strike group as a whole, and each reduction was of statistical significance. The reduction from the pre-strike to the strike year runs counter to the provincial trend as manifested by the rest of the Ontario boards (combined). For them the ratio improved in the strike year and then declined, but neither change was statistically significant. The ratios were .54, .50, .47 (strike boards) and .53, .54, .52 (no-strike boards).

Generally, then, we would say that the statistical record provides evidence that the grade 13/university transition was adversely affected to a significant degree in the strike boards by the end of the strike year,

and the general decreasing trend evident in the province in the post-strike year was more marked in this group of boards--suggesting that they had probably not really recovered from the disruption. If we can take the pre-strike ratio levels as indicating the norm, then in ratio 1 (applicants to enrolment) the relationship of the strike group to the no-strike group might be expressed as .76 and .73; after the strike it was .68 and .71. Ratio 2 (registrants to applicants) had changed from .72 and .73 (1974/75) to .69 and .72 (1976/77). Ratio 3 (registrants to enrolment) had changed from .54 and .53 to .47 and .52.

The drop in applications in the strike year we first explained as follows: Students applying for university places from the schools do so on common application forms obtained at their schools in February/March of their final year. They are in an "applying" milieu: their peers are filling in applications; their teachers (particularly guidance personnel) are helping them complete application forms, choose programs, and assess their chances of acceptance. Although the Metro strike was over by the time of application, the schools were not yet functioning normally, and in some of the other boards of our sample the strike was on in the months of application. This was our initial explanation for the significant reduction in applications, but when we received the 1976/77 (post-strike year) figures we discarded it.

In any case this explanation would not account for the 1975/76 reduction in the ratio of registrants to applicants. That is more likely to be explained by the adverse competitive position of the grade 13 students of these boards--as evidenced by the changes in the means of the average marks of applicants to certain programs (maths, engineering, and science; see #17 below).

That explanation is only acceptable, however, if one accepts the "comparability" of teacher-assigned grade 13 marks. Changes in these marks are not a very acceptable basis for comparison of student achievement; but since the marks are used as the main basis for university selective admission decisions, any change in their distribution cannot be ignored. So whether any change in marks reflects a real decline in achievement is not the question. A reduction in marks does represent, in our opinion, an adverse competitive position--warranted or unwarranted.

The same three ratios were calculated for the strike and the no-strike boards and for the strike boards individually for these three years, by type of school. It seems to have been students in the types of schools

that emphasize academic programs whose transition was disarranged--the first ratio was significantly lower in the strike year for Collegiates, Secondary Schools, and some of the "alternative" schools. The second and third ratios also decreased significantly in the strike year for the first two.

The comparison of changes in the grade 13 marks over these three years was made by sex of students, by the two sets of boards (strike/no-strike), and by postsecondary program being sought. Comparison was by ranges of final average marks (weighted--i.e., best of six credits) and by means and standard deviations of the weighted average final marks.

16. The females applicants' average marks were invariably higher than those of the male applicants; the mean differences in average marks between the sexes were highly significant. The mean differences in average marks among the strike boards were highly significant. However, these two differences did not show any significant variation in relation to year of application.

17. The percentage distribution of the weighted average final marks of university applicants varied considerably by program but not greatly from one year to another over this three-year period. The mean average marks of the students from the no-strike boards were consistently higher than the means of the applicants from the strike boards. But this was true whatever the year of application. However, when the significance of the variance in the means was assessed by board (strike vs. no-strike), year of application (pre-strike, strike, and post-strike), and program being sought, then it was possible to judge how much of the marks variance was being contributed by the various factors. The marks difference arising by virtue of the interaction between board category and program sought was highly significant. The variance introduced by the year of application was not significant. The two-way interactions between (i) the board category and program desired and (ii) the program desired and year of application were statistically significant. The three-way interactions among the variables were highly significant.

With no standardized measures to be used as benchmarks, it is difficult to judge the basis for the changes in teacher-assigned marks from year to year, and hence the relationship of any apparent change in the strike year to the strike itself. However, to compare non-standardized marks with other non-standardized marks, not as a measures of achievement but as "points" bearing on a competition, is more defensible. In the

selection competition for admission to university programs in Ontario from Ontario grade 13, marks are of prime importance. The review of the marks of these years demonstrates that the interaction of the year of application, the board category (strike vs. no-strike) of the applicant, and the program being sought does provide the basis for statistically different marks distributions. The year of application alone is not an important variable--the variance produced by the board category and the program sought is greater. But the year of application added to the other variables interacts to push the variance to levels which cannot be explained by chance.

The effect of the year of application is seen when the pattern of change is depicted. For four of the nine broad categories of university programs, the strike year saw a considerable reduction in the marks of applicants from schools of the affected boards, a reduction which was temporary in that the marks more or less recovered the following year. That this was not a general provincial trend is seen when we compare the marks pattern of these applicants with the marks of students from no-strike boards applying for entry to the same programs in the same three years. It is reasonable to conclude, therefore, that the average marks of students of strike boards applying for programs in science, engineering, commerce and business, and nursing were unduly depressed in the year of the strike, and thus these students, as a result of the strike, were placed in a disadvantageous competitive position. Applicants for these programs take certain common courses--notably mathematics and physical and biological sciences--and so it is reasonable to infer that these were the subjects adversely affected by the strike disruption.

Such a conclusion is congruent with the other findings (dropout rates, transition ratios), which indicate that the statistically significant "student flow" changes which accompanied the strike year seem to have been concentrated in effects on grade 12 and 13 (particularly the latter), and particularly in the academic-type school. All the effects were adverse. Dropout rates rose unduly, ratios of university applicants to the grade enrolment pool fell, ratios of university registrants to applicants fell, and ratios of registrants to the grade enrolment pool hence also fell. Many of the statistically traceable changes in the strike boards' schools were confined to their grade 13 records, and almost all the changes observed were more serious for that grade than for other grades. The observed statistical changes in student flow, destination, and transition

in the strike boards generally were adverse and generally were not shared by the boards of the rest of the province combined. So although it cannot be *proved* that these changes were directly "caused" by the strike, it is reasonable to consider them as "effects" of the strike. These ten boards are exceedingly different local systems of education. In 1975/76 they shared only one common characteristic not general to other Ontario boards--their school service was disrupted by a strike, and the students' school year was abnormal by virtue of that condition.

# 3 Strike Effects: Overview and Analysis

PART ONE: INTRODUCTION

To this point attention has focussed primarily on the tasks of describing and summarizing. This has involved a description of the major strike itself, important as background to the component studies; a history of the development of the research, important to an understanding of the limitations of the study and the data we were able to obtain; and separate descriptions of the three component research projects and their main findings.

As we had originally conceived it, the objective of this chapter of the summary report was to move beyond description of the findings of the studies to provide a general framework within which findings could be interpreted. The goal was thus twofold: to provide some coherent theoretical treatment of strike impacts, and to interpret the findings of the studies within this framework. Such an attempt is clearly made necessary by the discrete nature of the studies and by the fragmentary nature of the findings, fragmentary in large measure because of the practical exigencies that constrained study design. We had thus hoped in this summary to sketch in the outlines of an interpretation of the findings which would make overall sense of the fragments. The route we chose for this attempt involved the generation of some systemic ideas in two main areas--achievement and motivation. A systematic formulation of these ideas would, we had hoped, create an integrated explanatory theory which would offset the inevitably piecemeal character of the findings. We had also hoped, by being systematic about the explanatory ideas, to facilitate choice between alternative explanations of the same findings, particularly explanations which used motivation and achievement. In short we had hoped to provide some understanding of why the strike had the effects on students that the component studies identified.

Our attempt to do this has been less than successful. The theoretical ideas developed below do, we believe, give a plausible explanation of some of the major findings of the component research projects. At the same time, the explanations offered must be viewed as tentative and at some points tenuous. There are probably other plausible explanations of the same data. Even using the ideas we have developed, we are sometimes unable to choose between major competing explanations of the same data. In the final analysis, we are thus able to provide only speculative insights into why the strikes had the effect on students that they did.

Thus qualified, the integration and synthesis of the main findings is organized in this chapter as follows. We focus first on academic achievement--what is in many respects the heart of the matter. Some general ideas about learning are set down (Part Two, II), and, from these, ideas about the potential impacts of strikes are developed (Part Two, III). This is followed by a review of findings of component studies within this framework. Part Three of the chapter is concerned with both the major alternative explanations for the main findings--motivational factors--and with other findings from the studies which lie outside the achievement area.

In general, in this chapter the ideas developed go beyond a "strike" interpretation of the data. The search is for a pattern of findings which are common to the studies and from which the main effects of the strikes can be extrapolated. Thus inferences are made even though the data are sometimes partial as to both the effects they cover and the population sampled. These extrapolations are based on the belief that findings which recur in the three separate studies, or which can be interpreted within an internally consistent framework, provide some basis for going beyond the narrow qualifications (for example, as to causality and generalizability) that are required for isolated findings in the three individual studies. As this re-analysis of the data is made, however, a concurrent attempt is also made to indicate the extent to which the interpretation moves "beyond" the findings.

There are several different kinds of qualifications that are important. While the framework for this interpretation strives to achieve internal coherence, and thus analysis with systemic properties, many of the variables introduced are not directly measured in the studies. Inferences must therefore be made from indirect measures (for example, from dropout rates to achievement). Similarly, interpretations sometimes "bridge" two of the component studies. An effect is detected by one,

while an explanation of this effect is hinted at by another. Bridges are thus made between components of the analysis which include different populations. For example, of the ten strike boards of the Transitions component only seven--six Metro boards, and Central Algoma--are included in the Attitude study, and this study includes an additional board (Thunder Bay) which had a strike in 1974/75. In addition, the Attitude component data focus on a restricted group of primarily grade 13 graduates. Since the populations covered are not identical, there are some risks involved in bridging the components. Also, the Attitude component study is heavily weighted by the Metro boards, which as the Transitions component notes are somewhat atypical. Again the theoretical ideas are given extensive development in the attempt to provide some remedy for this kind of problem. Finally there are some contradictory findings, areas where the data from two of the components do not fit together.

## PART TWO: ACADEMIC ACHIEVEMENT

### *I. Introduction*

The objective of this section is to develop some theoretical ideas. These ideas, in turn, provide a framework for the understanding of the potential impact of strikes on students' academic achievement. The strategy relied on involves not the goal of predicting strike effects in absolute quantitative terms, but the goal of making relativistic statements about the "most likely" locations of strike impacts on achievement. Attempts to generate an analysis of the former, absolute, kind require an understanding of the relationship between instructional time and academic achievement which at present does not exist and which, for reasons set out below, is far too complex to be undertaken here. Thus here a limited question is asked. Given that the overall effects of a strike might be evaluated empirically and inductively through research, where are these effects likely to be most pronounced?

As we will be suggesting in the next chapter, answers to this question are useful from a policy point of view.

A variety of arguments are constructed in the theoretical discussion in this section of the chapter. First, an analysis of the internal structuring of learning and knowledge is used to locate ideas about the ordering of school learning by time (through grade levels) and its cumulative nature. Second, differentiations by subpopulations of students are examined and ideas developed about extra-school access to skill learning and

its distribution in the backgrounds of students. Third, an elaboration of the "structure of knowledge" arguments is used to explore comparisons in rates of learning at senior secondary grades by subject area. Fourth, increases in the rates of learning of complex skills at higher grade levels are examined. Finally, variations in the balance between "practice time" and "instructional time" are discussed.

The ideas developed have reference to the full range of schooling from primary to secondary grades, even though our data deal only with strikes in secondary schools. References to primary grades are included for theoretical completeness. As will be evident below, the theory emerges more strongly if contrasts can be made over a wide range of variation in school characteristics. There is nothing new or original about these ideas themselves. They are commonsense ideas about knowledge and learning. What is new, however, is the attempt to organize this discourse into a sequential and logical framework so that some of the ideas "follow" from others.

## *II. Theory*

Schools, at least as far as their academic objectives are concerned, teach both skills and knowledge. Skills are generalized abilities that range from exceedingly simple things such as recognition and classification, through elementary computational and reading skills, to relatively complex abstract reasoning abilities, logic, and high-level analytic skills. Knowledge, in contrast, is specific and contained within the conventional identifications of subject areas.

The focus of school curricula varies. In primary grades, the emphasis is on the teaching of basic skills. Any specific knowledge that is imparted has little long-term importance and is rather a method for teaching skills. Only in senior secondary grades does knowledge become the primary focus of teaching. At this level, at least as far as specific teaching is concerned, the relatively complex skills appropriate to the level tend to be downplayed. In part this lack of emphasis is related to the problems associated with articulating and specifying these skills. Complex skills are learned at higher grade levels, but their learning tends to be intuitive--an outgrowth of the learning of specific bodies of knowledge.

In the theoretical ideas set out below, one single idea is of prime importance: learning is a cumulative and necessarily sequential

process. A number of different internal interdependencies can be specified. First, skill learning itself is cumulative. At each level more complex skills build on less complex ones. Second, the learning of specific levels of knowledge is dependent upon the possession of relevant skills. Thus knowledge and skills interlock cumulatively. Indeed, a good argument can be made that most of what goes on in approximately the first eight grades of schooling is skill learning, a process of building and cumulation of increasingly complex skills. Thereafter, knowledge learning can "take off," proceed rapidly, and accelerate. In marked contrast, in the lower grades specific knowledge is to be viewed as unimportant, "forgettable" in the long run; it is not "knowing" that is important in primary grades, but "being able to." Third, knowledge itself is sometimes cumulative. (The qualification "sometimes" is developed toward the end of this section.) It appears that there are systematic variations between subjects in the extent to which cumulation occurs. What are referred to below as "hard" subjects--mathematics and science--have an internal structure to their knowledge which is itself cumulative. Learning of certain information logically precedes learning of other information: the later learning requires the student to know areas taught before. Contrast this situation with "soft" subjects--history or English--where little ordering of this type is inherent in the nature of the subject.

The situation may be summarized as follows. The "levels of complexity" dimension is here dichotomized into Basic and Complex in order to simplify the discourse and avoid the necessity of constant qualifiers such as "relatively more complex" and "relatively less complex."

BASIC

*SKILLS* Objective of teaching in lower grades and foundation for all subsequent learning (e.g., classification, seriation, reading comprehension, arithmetical computation).

*KNOWLEDGE* Little knowledge is taught in primary grades. It is regarded as relatively unimportant and "forgettable." Knowledge taught is intended to result in skills (e.g., explorers in social studies).

COMPLEX

*SKILLS* Dependent on basic skills but not specifically taught in schools to any great extent (though they receive more specific attention in postsecondary education); learned intuitively in relationship to complex

knowledge (e.g., classical experiments in the physical sciences; applications extended to social science, such as correlation and randomization; processes of historical inquiry).

*KNOWLEDGE* Objective of teaching at senior grades and in post-secondary education. Cannot begin until requisite skills have been learned (e.g., physics, chemistry, Canadian history).

Cumulation, then, refers to (i) dependence of Complex Skills on Basic Skills; (ii) dependence of Complex Knowledge on Basic Skills; (iii) within Complex Knowledge, dependence of the more complex on the less complex for certain subjects. The category Basic Knowledge, what is taught in the primary grades, is as we noted relatively unimportant, and the propositions developed below refer only to basic skills on the one hand, and to complex skills and complex knowledge on the other.

The fundamental notion of cumulation in learning described above can be summarized in the following proposition:

(1a) *Any given level of skill learning and/or knowledge learning for which instruction is attempted in school will have as a "prerequisite" a set of "more basic" or "less complex" skills, which must have been previously learned if successful learning at the given skill level is to occur.*

Thus, for example, a child who is learning to read must understand that word order for reading English or French proceeds from left to right and from top to bottom of the page. Ability to read is, in turn, a prerequisite for all subsequent learning. And so on. This relationship between basic skills and complex skills sets the overall shape of a curriculum in which there occurs sequential learning. Basic skills are taught first. These in turn form the foundation of elementary complex skills and higher levels of learning, for both knowledge and skills build on the elementary skills.

Some qualifications and elaborations to this first proposition are also important. First, some complex subject matters draw disproportionately on a restricted range of basic skills. Thus, mathematics builds on computational and elementary number skills, and draws on the ability to write prose to a much lesser extent. Physics builds on mathematics. History relies on the ability to read and to write essays and hence in Canada on learned ability in the English or French language. Second, the learning of

skills does not cease once these skills themselves cease to be the focus of teaching. Rather, skills continue to be learned in school at higher grades. When complex subject matters fill the timetable, however, skill improvement is an outcome of knowledge learning rather than a specific part of the curriculum.

Proposition (1a) above is a proposition about the structure of knowledge learning. Implicit in it are two propositions which characterize quite different units of analysis: the curriculum, the form in which the knowledge is organized for learning in schools; and the children or students who come to learn the knowledge. These propositions are

(1b) *Curriculum is sequentially organized. Within it, the skills themselves must cumulate, with the more complex skills building on preceding less complex ones. Similarly, the knowledge taught at senior secondary grades builds on requisite skills which must precede it.*

The general structure of the curriculum is inherent in the structure of the knowledge to be taught. While the sequence is not minutely specified by the nature of the skills and knowledge to be imparted, and while there may be considerable debate about *how* skills get imparted (i.e., about teaching techniques and methods), the broad outlines, the orderings of the sequences, are largely given, and the overall similarities in curriculum structure between different societies' school systems attest to this.

(1c) *Learning is cumulative. What is meant here is a familiar idea. Imagine skills to be characterizable in terms of their level of complexity. At the low end of this scale lie basic skills; at the high end, complex skills. By asking a student to perform skill-testing exercises (essentially what all testing procedures both "standardized" and non-standardized do) we can measure the maximum skill level at which the student is capable of performing. Once this maximum level is established, a second presumption is also established: the student will be able to perform at all skill levels below this maximum level. This occurs because of the sequential structure of the skills involved. In order to perform a task at his or her maximum level, the student must have mastered the preceding levels on which this maximum level depends.*

*It is of note that the term "knowledge" can be*

*substituted for "skills" in this proposition only with certain qualifications. While higher-level knowledge often does require the knowing of lower-level knowledge, this statement seems to characterize certain subjects--particularly science subjects--more than it does others. The qualifications involved here are developed below.*

Next it is important to note a third item which is implicit in the discussion so far, and this is the element of time. *The learning that students do takes place over time*. Skills that are cumulative must be learned in a sequence in which basic skills *precede* both complex skills and complex knowledge. In a child's learning process, any "premature" attempt to move forward (i.e., to teach a child the next level before he or she has mastered the previous one) is likely to fail. This idea cannot be used to argue that the learning at a particular skill level or of particular knowledge must occupy a given *amount* of time. A child beginning to read may take two weeks or two months to master a first reader. Within that process, however, word recognition will precede the understanding of simple sentences, while complex sentences will be further ahead.

The organization of the school curriculum by grade level to a large extent reflects the time-sequence nature of the learning process. The amount of time this sequence takes up, however--the years between entering grade 1 at age 6 and leaving grade 13 at age 19--may be neither inherent nor necessary. In short, nothing we have said so far implies that the curriculum of, say, grade 8 must occupy one school year and not half a year. At the same time there is *some* reason for presuming that the curriculum of grade 7 is likely to follow grade 6 and that of grade 8 to follow grade 7.

This phenomenon, the potential time-elasticity of the curriculum, is important in any discussion of the impact of teachers' strikes on student achievement. Indeed, in the attempt to move from the above ideas to a discussion of strikes, the problem of "curriculum elasticity" becomes the paramount focus. If the curriculum of schools can be viewed as highly elastic (that is, if, in a school version of Parkinson's law, the curriculum can be expanded or contracted to fill the amount of time available for its teaching), then it follows that a school strike will likely have little impact. If the curriculum is elastic, teachers' catch-up efforts after a strike will simply telescope the curriculum (perhaps increasing the pace, and decreasing the amount of "unimportant" material) so that it occupies fewer hours. The sequential nature of the learning

process will not *necessarily* be disrupted, and the impact of the strike may be nil.

The following example provides a good demonstration not only of how sequencing and cumulation of knowledge are crucial in skill learning, but also of how the curriculum telescoping that might occur after a strike can be achieved. An acquantance at the Ontario Institute for Studies in Education experimented with teaching his 7-year-old daughter and 10-year-old son classical Euclidian geometry, a subject usually taught with only moderate success in the second year of high school. He did so by first analysing the skills necessary for learning geometry and then sequencing them so as to maximize transfer from tasks taught early in the sequence. The outcome of the experiment was that both the 7-year-old and the 10-year-old learned to solve problems from the second-year high school geometry curriculum. The 7-year-old, however, took longer to learn than the 10-year-old because she had not mastered some of the related skills that the 10-year-old had already acquired, and hence had to learn these first.

In short, we may summarize the argument to this point as:

(1d) *The learning of skills takes place in an ordered time sequence which is set by the structure of the skill being learned.*

Yet there is no presumption generated about the amounts of time this sequence takes. Moreover, if we are to have tight arguments which relate time in school (and hence time lost during a strike) to learning, such presumptions have to be generated by further arguments. It is to this problem--to the question "Can such arguments be generated?"--that we now turn.

The answer to this question is a qualified "no," at least as far as this project is concerned. The reasons for a negative answer become immediately apparent if the argument is set up in its most extreme form: "Is it possible to argue that a given amount of time in school is absolutely necessary to the prevailing level of achievement associated with the relevant grade?" Concretely, suppose we look at a group of children in grade 6 and establish their mean reading level. Can it then be argued that it was absolutely necessary that these children spend the time between grades 1 and 6 in school to learn these skills? The answer again is "no." First, the children within this group will predictably exhibit widely varying levels of skill in reading: Some of those who have above-average

skill levels may even have "skipped" grades and achieved, with a year's less schooling, higher scores than classmates. Second, some of these differences will be related to "background" characteristics of parents. The roughly constant amounts of schooling the children have will not account for their varying performances, whereas variations in their backgrounds will. Finally, if we were to move away from examination of this group to comparative evidence, we would discover further disconfirming data. We might find children in isolated areas of Canada who have never attended school but whose reading level is comparable. Cross-national comparisons might show that Swedish children achieve comparable reading levels by the end of grade 5. In summary, variations in individual levels of achievement given similar amounts of schooling, and similarities in levels of achievement given widely different amounts of schooling, will make arguments for the necessity of any fixed amount of schooling open to question.

The extreme form of the argument rapidly collapses and reduces to a question, "*How much* is necessary?" Extending the example we used above, "How much of the grades 1 through 6 schooling is necessary to achieve grade 6 reading level?" Phrased more generally, this question asks, "Given data which describe prevailing skill levels at a particular grade level, *how much* of the schooling preceding this point is necessary to the achievement of the skill level?"

Is it possible to argue that a given amount of time in school is absolutely necessary to the prevailing level of achievement associated with the relevant grade?

The question as posed is unanswerable. The issues that are now involved are far too complicated for us even to begin to address them here. An answer requires a complete quantitative understanding of learning. It would be necessary, for example, to discuss teacher effectiveness. More effective teachers would likely need less time to teach a skill than less effective ones. Similarly a whole range of school variables--pupil/teacher ratio, quality of school resources, etc.--might make a difference. Characteristics of pupils would be relevant. Some children learn faster than others, and these differences are, as was noted above, in part explained by characteristics of the children's parents. At best an answer to the question would have the form "Given teachers with characteristics A, B, C, schools with characteristics D, E, F, pupils with characteristics H, I, J, the amount of schooling required for the learning of skill X to level Y is Z."

Our inability to even attempt an answer to this sort of question seriously jeopardizes the effort to make predictions about the impact of a strike on student achievement. If the relationship between time in school and achievement cannot be tightly specified, it is not possible to derive precise predictions about the impact of a strike (an interruption in time in school) on achievement. If curriculum is elastic and some amount of schooling can be dispensed with, "telescoping" after a strike may provide immediate remedy for any negative impact on achievement. Unless we can answer the questions "How elastic?" and "How much telescoping is possible?" there will be no grounds for supposing that strikes will affect achievement at all. In concrete terms, if the amount of classroom time which is taken up to cover the curriculum of grade 13 physics cannot be closely tied to achievement in physics, we cannot generate the presumption that a strike will affect this achievement.

A strategy for approaching this problem must cope with the unanswerability of the question "How much schooling is necessary?" Specifically, it is necessary to abandon a search for direct quantitative predictions about strike impacts and seek instead an answer to a slightly different question. This reformulated question is, "If a strike were to have an impact, where would we expect its occurrence to be most likely?" "Where" is specified in terms of grade level, subject, and student characteristics. To provide an answer to this modified question requires not the absolute and precise determination of the relationships between time in school and learning, but the comparison of curriculum subjects, grade levels, and subpopulations of students so as to identify areas where the relationship between time in school and achievement is likely to be tightest. In short, we now ask the question in a third form: "Given that we have a researchable strike situation so that some empirical assessment of effects can be made, where would we expect any effect to be most pronounced?" This form of the question is advantageous from a practical, policy-making point of view. If the locations where maximum impacts occur can be specified, these locations can become the focus of remedial action in any recurrence of a strike.

The discussion above of what we would need if we were to try to generate absolute or quantitative arguments about the relationship of time in school to achievement suggests four areas that might be examined:

First, it might be possible to compare teachers and ask if the students of some teachers might not be more affected by strikes than those of other teachers.

Second, subpopulations of students might be compared. Is there, for example, any reason for supposing that those from low socioeconomic backgrounds might be more disadvantaged by a strike than those from high?

Third, subject areas can be examined. Is it possible to develop ideas which will suggest, for example, that students in physics are more likely to be affected than those in geography?

Fourth, it might be possible to look at types of school and school characteristics. Is there, for example, any reason to believe that students from a technical secondary school are more likely to be affected by a strike than those from an academic high school?

For practical reasons, the discussion below is limited to the second and third of these areas--student subpopulations and subject areas. Discussion of teacher characteristics is not introduced. As a research problem the evaluation of the teaching performance of teachers is extremely elusive. Furthermore, in the data available from the component studies of this project there is almost nothing that could be viewed as analysable in these terms. We have no direct data in the study on teachers. The component studies similarly lack extensive reference to school characteristics. Indeed, where they do contain such references--for example, in the Transitions study's analysis of strike-related differences in university application by type of secondary school attended--differences seem to reflect primarily curriculum or subject-area effects and are thus better discussed in those terms.

Thus, our focus here is on students and their academic subjects and the way in which properties of these two might affect the relationship between time in school and achievement.

In the discussion of the "structure of knowledge" at the beginning of this section a distinction was made between "basic" and "complex" skills and varying levels of complexity of knowledge.

It is arguable--and this argument is supported by the broad outlines of the literature on background effects on academic achievement--that the interaction effect between students' background characteristics and basic skill learning is greater than the direct (and in time later) interaction effect between students' background characteristics and complex knowledge learning. The model suggested is what is known as a "stochastic" process. The backgrounds of students affect their learning of basic skills. The learning of complex skills and the knowledge contingent on these thus builds on a foundation which exhibits a "background

component," but this background component affects achievement only through basic skill learning. There is no (or a very small) direct effect of background on the learning of complex skills or complex knowledge.

This argument makes a great deal of sense if we consider access to the learning of basic skills vs. complex skills and knowledge in extra-school situations. The situation here can be summarized in two propositions.

(2) *The general extra-school levels of access to basic skills are higher than those for complex skills or complex knowledge. The more basic the skill, the more a child is likely to experience the learning of that skill outside school. The more complex the skill, the less likely there is to be extra-school access to it. Similarly, the more complex the knowledge, the less likely there is to be extra-school access to it.*

Thus, for example, a large proportion of the grade 3 population has outside-school access to reading material, conversational English, and opportunities to perform simple arithmetic operations. These learning opportunities run parallel to and reinforce school learning of the same skills. In contrast, extra-school access to grade 13 physics is minimal. The probability of a student having a parent with this knowledge is small. The likelihood that this knowledge or even the complex skills which it requires will be continuously part of the student's home milieu will be smaller still. Thus, whereas basic skill learning will (to a varying degree) be an ongoing function of a grade 3 child's home, even in those homes where help with grade 13 physics might be obtainable a "special" effort and cooperation between student and parents will be required for there to be any impact.

(3a) *Access to extra-school basic skills varies systematically with the background characteristics of students. In particular the higher the socioeconomic status of parents, the greater a child's extra-school access to learning the skills. Similarly, if the language of instruction in school is the language of the home, the extra-school access to relevant skills is greater.*

(3b) *There is only a weak and therefore negligible relationship between parents' socioeconomic status and complex skills and knowledge.*

We have included the assertion about language background because of its relevance to the Ontario situation, although this inclusion goes well beyond the data available from the component studies. The differentiation between basic skills and complex skills and knowledge with respect

to socioeconomic background follows in part from proposition (2). Background access to complex skills and knowledge is probably related to some small degree to socioeconomic status of parents. Parents who have expertise in, e.g., the grade 13 curriculum will likely be of high socioeconomic status. But the decreasing frequency of coincidences of student subjects and parental expertise as the grade level increases will mean that these matchings will occur for only a small proportion of secondary students. Thus the overall direct impact of parents' socioeconomic status on complex skills and knowledge learning will be negligible.

To this point no differentiation has been made between different subject areas in the curriculum of schools. The focus has been on general properties of the organization of knowledge, curriculum, and learning, properties which are common to different subject areas, and on differences in students which again exist independent of subject areas.

There is, however, an analysis of differences in the internal structure of subject areas on which predictions about the differential impact of strikes can be based. The analysis requires a return to the ideas set out above concerning the structure of knowledge, and a refinement of them. This refinement involves seeing internal structuring of subject areas in the curriculum as variable. Specifically it is proposed that the logical structure of the knowledge taught in certain subject areas is such that a tight sequential ordering of the curriculum in these areas is implied by the knowledge itself. The most extreme examples are mathematics and physics, where the logical structure of the material that constitutes the grade 13 curriculum is highly organized. It both (i) requires a fairly well defined sequential organization within grade 13 and (ii) implies that the students who enter the curriculum will have previously experienced a similarly organized sequential learning process. For example, physics requires mathematics both prior to and in some cases concurrently with the physics course. In contrast, grade 13 English literature, while it relies on past learning and in this sense has prerequisite *skills*, is less tightly organized sequentially as a body of *knowledge*.

These differences are very clearly reflected in the ways in which marks tend to be assigned in the different subject areas. An "understanding" of physics or mathematics at the grade 13 level can be assessed via students' answers to problem sets. These answers are fairly clearly "right" or "wrong." A grasp of the subject area is demonstrated by "right"

answers, which are produced by an understanding and application of general principles. Few would maintain, however, that a general understanding of Canadian history is demonstrated solely by answers which can be strictly assessed as "right" or "wrong"--for example, by producing a list of names and dates of Prime Ministers of Canada. Teachers are more likely to evaluate "general understanding" intuitively from student essays in which a variety of possible nuances on and interpretations of factual material occur. Thus in some subject areas there are not "right" answers which form sufficient bases for teachers' judgments of their students' understanding of general principles.

A whole series of differences are associated with this basic difference. For example, physics teachers will generally agree on what it is important to include in courses at a given level. The scope for disagreement among English or history teachers will be much greater. Such things are evident from a comparison of the curriculum guidelines which form the basis for Ontario secondary school courses. Course guidelines in physics, mathematics, and to a lesser extent chemistry and biology offer tightly organized schemata within which sequential ordering is emphasized and choice limited. Guidelines for English, Canadian history, and social studies offer a wide range of possible schemata with few suggestions as to ordering; instead they emphasize teacher choice and initiative in the shaping of a specific course from their proposals. Guidelines in technological subjects are similar to those for pure sciences--a much greater degree of emphasis is placed on a prescriptive curriculum.

An important consequence follows from these subject differences. The more the logical structure of knowledge in a subject area creates a tight sequential organization of the curriculum, the greater the intensity of the teaching/learning process. In a slightly different form, one which relates the idea to our earlier discussion of the problems associated with specifying "necessary" amounts of schooling, this argument suggests that "hard" subject areas (those with tight sequential organization) tend to be those which are taught most rapidly and at a rate approaching the maximum rate at which at least some of the students enrolled can absorb the material. In contrast, in "soft" areas (those where a tight sequential ordering is not implied by the structure of the subject) rates of learning do not approach these limits so closely.

It is not problematic to see how this might occur. Because of the

phenomenon of "right answer" evaluation in these "hard" areas, it is much easier for teachers to assess whether or not students understand the core of the subject. Teachers in the area share a clear specification of what these general understandings are. Criteria for entry to the courses are clearer to students, who on the basis of past performance in relevant areas can make relatively realistic assessments of their own potential. Thus the courses attract students whose abilities "fit." Within the courses they can be pushed, and because of the superior and more percise assessment possibilities that lie in "right answer" evaluation there is more or less immediate feedback to the teacher on the rate at which understanding is progressing in the class. If the teacher goes "too fast" or ineffectively teaches a portion of the course, the effect will be immediately apparent and the teacher can slow down or repeat.

In contrast, "soft" subject areas lack these characteristics. Some students will be present because they respond positively to the subject area, but others will enrol by default--because they make a negative assessment of their abilities to pursue "hard" subjects. (They may also in fact have low ability for the "soft" subject; but because of differences in the nature of the skills, they are more likely to make unrealistic self-evaluations.) From the teacher's point of view the ambiguities in the performance-feedback from students are much greater. There are no "right answers," and as the class proceeds it is much less clear whether students have "got it." As a consequence teachers will tend to be unwilling to proceed "too fast," relying instead on repetition to ensure that the students achieve general understanding. In sum, in order to protect against the error of assuming that their students have understood when they have not, teachers in "soft" areas proceed relatively slowly. In contrast, teachers in "hard" areas can proceed faster because they can be much more confident in their assessments of levels of student understanding.

(4) *At the senior secondary grade levels (i.e., those where the more complex subject areas are taught) the "harder" the subject area, the closer the rate of learning approaches the limits of students' ability to absorb material. The "softer" subjects, in contrast, lie further from these limits.*

There is also a plausible extension of this argument which is again connected to the distinction between basic and complex skills and basic and complex knowledge. It seems likely that in the knowledge of

"soft" subjects, success is, to a much greater extent than in "hard" areas, a consequence of the possession of certain skills. The student who has the linguistic and writing ability to express his or her understanding of Canadian history in an essay is much more likely to be seen as possessing understanding than a student who does not. Their levels of understanding are likely to be seen as different even if they are in fact very similar. Thus, in "soft" areas the processes by which evaluation of knowledge takes place involve the student's exhibition of skills which, strictly speaking, are not part of the subject area. In "hard" subjects, in contrast, the evaluation process by which knowledge is demonstrated is structurally parallel to the knowledge itself. In summary, whereas in "hard" subjects both skills and knowledge are crucial, in "soft" areas general skills which are often outside the subject area tend to be of much greater importance.

The argument above connects rates of learning to the structure of the subject being learned. There are two other arguments which connect rates of learning to the *grade-level location* of a subject (as opposed to the subject itself). These focus on student learning of "study habits" and the selectivity of education. Both of these factors provide reasons for believing that the rate of teaching/learning is higher at upper grade levels. The arguments in brief are as follows.

One impact that education has, particularly on successful students, is the learning of educational self-discipline, or study habits. While good study habits are in principle separable from academic performance, in practice they are likely an outgrowth of success (good students are encouraged by success to learn to work on their own) and certainly contribute to success (students who work hard in general do better). Possession of "study habits" is particularly important given certain structural characteristics of schools, particularly pupil/teacher ratios. Not all of the time students spend in school involves direct instruction from teachers. Some of this time is "practice time," in which students effectively work on their own and self-discipline is important. Similarly, school work which is assigned for completion at home places a premium on self-discipline.

Not only do variations in the amount of independent study of which students are capable account for differences in individual achievement levels, but they can also be used to account for differences in rates of complex knowledge learning by grade. At higher grade levels

instructional time tends to be concentrated in school hours, and it is intensive. Practice is relatively unsupervised, involves little direct teacher contact, and takes place to a much greater extent outside school through "homework." In short, faster rates of teaching can occur at higher grades because much greater reliance can be placed on students to work on their own.

This pattern is reinforced by selectivity. Students who perform well academically at higher grades find themselves in classrooms with others of similar ability levels. Typically these classrooms--for example, those in grade 13--cater to students with postsecondary ambitions. This feature of school organization again permits the acceleration of learning in certain (academic) course subjects at higher grades.

The conjunction of these two characteristics--selectivity by achievement and student self-discipline for study--creates a further basis for assuming that rates of instruction in areas of the curriculum where students possess these characteristics will be higher and will tend more closely to approach a maximum possible rate of teaching/learning. In summary,

(5) *At higher grade levels in highly selective academic subjects (where students are self-disciplined achievers) learning rates will tend to approach maximum possible rates more closely than in (i) other subjects at the same grade level and (ii) all subjects at lower grade levels.*

*III. Implications for Strikes*

The arguments which link the above general analysis of learning to strikes are organized as follows. First, two conditions are identified which must be met if a strike effect is presumed to be likely. Second, arguments are generated to specify the "most likely" school situations in which these conditions will be met. Both of these sections rely on the general ideas developed above.

As a prelude to this discussion it is important to note that the duration of the strikes that are the focus of concern here was short relative to the total amount of time children spend in school. Two months is a very small proportion of twelve or thirteen school years. Given that learning is built up cumulatively over a long period, any given performance level relies heavily on previous levels which are already fixed. This is particularly true for skill learning, where previously learned skill levels are unlikely to be changed by a strike any more than we would

expect them to be changed as a result, for example, of the summer recess. The identification of likely locations of strike effects must create a stronger presumption than that which is associated with a simple "pause" in education.

In order for us to suggest a stronger likelihood of a strike impact on students identified by certain background characteristics or on students enrolled in a particular subject or at a particular grade level in school, two conditions must be met.

> *A cumulative learning sequence must be disrupted: i.e., a skill or knowledge which is important in subsequent learning must fail to be taught.*
>
> *"Catch-up" efforts must not be possible: i.e., curriculum elasticity must be low so that the learning sequence cannot be preserved simply by retaining the appropriate cumulative sequence while covering the sequence at a faster than usual rate.*

The first of these conditions creates a presumption that the disruption will be consequential (i.e., it will have effects on subsequent learning after the strike). The second is important because it creates a presumption that the effect is not easily reversed. It suggests that catch-up attempts after the strike are problematic.

The two conditions taken together are probably sufficient for a strike effect on achievement. Each condition if taken individually is not sufficient for an effect. Indeed, some locations where disruption in cumulative sequencing is potentially extremely serious are probably most amenable to catch-up efforts. For example, in primary grades children are taught to read, and any dislocation in reading skills will have marked long-term effects on a child's subsequent educational success. At the same time, curriculum at this level is probably highly elastic. First, most children have extra-school access to learning of reading skills; "speeding up" is thus possible because outside resources unaffected by a strike are being drawn on. Second, any strike effects can be "bumped" across grade levels; since there is little differentiation of children by ability or specialization by subject, grade 4 can essentially begin where grade 3 finishes, and any catch-up effort can thus be spread over a long time-span with very little impact on the overall rate of teaching.

In addition, the overall rate of teaching is likely to be well below the maximum possible rate. Children of a wide range of abilities are present in class, a situation that encourages rates below the capacity

of many individuals. Similarly, since study habits are not developed to any great extent, there is a lesser separation between practice and instructional time and a slower rate of progress. It is, however, possible to generate here a prediction about the most likely locations of the effects of a strike by differentiating students by background. Both the socioeconomic status of parents and the language spoken at home are related to basic skill learning: children from lower-status homes and minority-language backgrounds have lower levels of extra-school access to skill learning. For these children, then, the curriculum is less elastic, since it is much more nearly their sole source of learning.

In summary

(6a) *Strikes in primary grades are unlikely to affect learning negatively, because curriculum is elastic,*

*but*

(6b) *Any negative effect of a strike on achievement which does occur in primary grades will be most marked*
*-- for children from low socioeconomic status backgrounds*
*-- for children who come from a home where a language is spoken other than the language in which they receive instruction in school.*

The contrasting arguments refer to grades at the top end of secondary education. In general, at this level, curriculum elasticity is considerably less, and arguments about disruption in sequencing can be made subject-specific. Overall levels of curriculum elasticity tend to be less, and rates of teaching higher. The faster pace at this level is the result of factors analysed in general terms above: students have acquired study habits, and ability levels tend to be more homogeneous. A catch-up response to a strike is thus less feasible not only because the rate of learning approaches the students' maximum limits more closely but also because, since learning is more exclusively a school-created phenomenon, "telescoping" cannot rely on extra-school learning. Finally, particularly in grades 12 and 13 catch-up efforts cannot extend over grade boundaries because these grades are at the end of secondary schooling.

Since a large number of subjects at senior secondary levels are also cumulative, both conditions which make strike impacts likely in these grade locations are to some degree met. Thus

(7a) *Strike effects are more likely to be observed at senior grade levels.*

Within these grades, some subject areas are more likely loci of effects than others. Tight cumulative sequencing and low elasticity are to a greater extent characteristics of "hard" subjects than they are of "soft." Teachers in grade 13 math, physics, and chemistry are less likely than those in English and history to be able to make up for a strike. Attempts to speed up or skip segments of the curriculum are much more likely in these areas to dislocate a tightly integrated cumulative sequence of learning. Hence:

(7b) *At senior grade level strike effects are more likely in "hard" subject areas than in "soft."*

Again in contrast to the situation in primary grades, differential effects by students' backgrounds are unlikely at this level (see proposition (6b)). While there is a marked relationship between overall levels of achievement and background, by senior grades in secondary school this effect is largely a historical one worked through the background patterning of previous basic skill learning. There is little continuing effect of students' backgrounds, because of the overall low levels of coincidence between student subjects and parental background. Thus while levels of achievement at senior grades are likely to be strike-related, changes in achievement patterns which are consequent upon a strike will likely not be patterned by students' background. Thus:

(8) *Strike effects at senior secondary grade levels will not be patterned by parents' socioeconomic status and will not show minority-home-language effects.*

There is, however, an alternate way (other than by background) of speculating about the way in which student characteristics might differentiate subpopulations of students with potentially high strike effects. If "background" characteristics are not important, can other student characteristics be used to differentiate high-strike-impact subpopulations at senior grade levels? One interesting possibility focusses on variability in levels of student self-discipline (or level of study habits) and connects this with a distinction also alluded to above--the division of in-school time into instructional and practice time.

The extent of student self-discipline is clearly variable. Some students work on their own without supervision much better than others. One likely teacher reaction to a strike, one method of telescoping curriculum, would be a reduction in supervised in-class practice time. Reduction in practice time would ensure that the overall amount of

instructional time remained unchanged despite a strike. Instructional time lost during a strike could be made up, but at the expense of practice time. Such a change in the ratio of instructional to practice time would place a premium on one or both of two student abilities--the ability to grasp general ideas without having to practice, and the ability through a high level of self-discipline to supply compensating extra-school practice. Strike impacts would be least on the most able students (those who required little practice) and on those who had well-developed study habits, sufficient to make up for in-school losses in practice time. In summary:

(9) *Strike effects are likely to be least pronounced at senior secondary grades for (i) those students who grasp general understandings without practice; (ii) those students sufficiently self-disciplined to compensate on their own for losses in in-school practice time.*

*IV. Interpreting the Findings*

The theoretical ideas developed above are intended as a framework for the analysis and synthesis of the findings from the component studies that pertain to students' academic achievement. The main focus, then, is to provide comment on the propositions whose domain is the data from this research project--propositions (7a), (7b), (8), and (9). Data from the Attitude component are also used to comment on some of the more general ideas (for example, concerning cumulative sequencing and rates of teaching) from which these strike-specific propositions are derived.

Connecting the data from the three component studies to the theoretical framework outlined above is in many places problematic. As we have noted elsewhere in this report, the data-gathering activities of the component studies were formed not so much by theoretical aims as by practical exigencies. The extensive reliance on secondary data that resulted from these exigencies means that much of the analysis below involves interpretation of data rather than the direct testing of theoretical ideas. Since, however, it is clearly important to attempt to evaluate the component studies within some unifying theoretical framework, the ideas above have been used to this end. Each subsection below thus deals with the bearing of the findings of the component studies on the propositions developed in sections II and III above. Contradictory findings are pointed out, and appropriate qualifications are introduced which offer cautions about the interpretive nature of much of the analysis.

As we note in the analysis below, it is difficult to choose between achievement and motivation, the two general areas which can most reasonably be seen as the intervening variables which "explain" the studies' findings. The foci of the component studies are on dropout and transitions, attitudes, and marks. These data thus deal only by inference with achievement and motivation. What is required is interpretation of findings; and, given the nature of the secondary data which the studies for the most part contain, testing alternative explanations and choosing between them is problematic.

*Proposition (7a): Strike Impact at Senior Grades*

The Transitions component provides the best data for comparisons of strike impact across grades. While the data permit these comparisons, they are, as we have noted, only by inference data about achievement. There are also inconsistencies between different data sources in this area. Some of the data within the Transitions component as well as data from the Achievement component could be viewed as not fitting with the general ideas under consideration in this section. The relevant findings--both pro and con--are summarized below in point form. We deal first with the information that permits comparisons across grade levels and second with that which is specific to senior grades.

(a) There was an increase in dropout in strike boards in the strike year which contrasted with a decrease in dropout in that year in no-strike boards.

(b) Dropout increased for each of the five grades, but the increase was marked in grades 12 and 13.

(c) The by-month pattern of dropout around the strike, in which strike boards experienced a "piling up" of dropouts in months after the strike, is strongly suggestive of a causal relationship between the strike and increased dropout.

(d) In the strike year the strike was cited as a primary reason for leaving most often by students in grade 13 (24%); 22% of grade 11 and 12 dropouts cited the strike as their primary reason, as did 14% of the grade 9 dropouts. Thus the relationship between reasons and grade level is in the direction expected: a greater impact in higher grades. In addition, the strike was cited most frequently as the primary reason for leaving school in the strike year by dropouts from every grade with

the exception of grade 9. In the year preceding the strike "employment" was the most important reason, while "dissatisfaction with school" was cited most often in the post-strike year.

Interpreting these data is problematic because the response categories shift over the three-year period to include "strike" as a reason in the strike and post-strike years; it was not, of course, a reason in the pre-strike year. Thus, as in the Attitude component, students could be seen as scapegoating the strike in the strike year. At the same time, we do know that dropout increased in the strike year and that maximum impact was on grade 13. The pattern of reasons for leaving given in interviews is thus generally consistent with the data on dropout rates.

(e) The data from interviews with dropouts also suggest that in the strike year there was a relationship between grade level and the plans for further study that the school leavers held. The incidence of dropouts' planning further education was higher among the strike-year dropouts than among those in the preceding and following years, and was markedly higher in the higher grades (particularly grade 13). This finding suggests that the students who dropped out in the strike year were more strongly oriented to education than dropouts ordinarily are. With other findings from this component it suggests that some number of them dropped out because of the strike, whereas in an ordinary year they would have remained in school, and that this type of impact was most severely felt in grade 13.

(f) In contrast to points (a)-(e) above, which tend to show a differential strike impact on dropout by grade, the Achievement component data show neither an overall strike effect nor a differential impact by grade. The relevant Achievement component data examine school marks in the City of Toronto board and for selected subjects in a sample of eight Metro Toronto schools. In addition, credit/enrolment ratios were examined for indication of an increase in dropout. Neither the analysis of these data reported in the Achievement component itself nor our subsequent re-evaluation of portions of these data demonstrated any change in the strike year. This finding is an important one and deserves careful examination.

As far as the data on marks are concerned, there are two possible ways of "explaining away" the contradiction. First, the findings on marks could be a function of the limited Metro and City of Toronto focus of the data on marks. The apparent lack of impact may be specific either

to the samples or to the sample frame of the rather different Toronto boards and not representative of all the ten boards studied in the Transitions component. A second alternative is suggested by the Achievement component itself where it is strongly argued that teacher-awarded marks are not adequate as indices of real academic achievement. Thus an impact on achievement may have been masked by the fact that teachers inflated grades in the strike year.

The Achievement component's analysis of dropout based on an examination of credit/enrolment ratios in the sample of eight Metro schools is somewhat easier to "explain away." The Transitions component's dropout analysis is based on much larger numbers of schools and much more detailed time-series comparisons with strike and no-strike boards. We are thus inclined to view these conclusions as correct and to consider findings from the eight-school Achievement component sample not to be generalizable. This comparison could also then be extended to some of the Achievement component's findings on marks. If the eight-school Metro sample is peculiar with respect to its dropout pattern in the strike year, it may also be peculiar in its mark distributions.

While the data summarized in (a)-(f) above all permit some comparison across grades, the component studies also include data whose focus is exclusively on students who were in grades 12 and 13 during the strike. Since we predicted that the strike's maximum effects ought to have been in these grades, these effects ought to be visible. While (a)-(f) show some inconsistencies, the weight of the data appears to suggest the existence of a strike impact on senior grades.

(g) The Transitions component shows that the transitions of the strike-board students to postsecondary education were disrupted in the strike year. The size of the impact is not large (decreases averaged approximately 4%), but it is in the predicted direction and statistically significant. Both the numbers making applications from the strike boards and the numbers of applicants actually registering were reduced.

(h) In addition, the Transitions component analysis of applicant records indicates that the average marks of applicants in "hard" subjects from strike boards in the strike year were lower, a pattern which contrasts with the trend for no-strike boards. (For analysis of by-subject differences see the next subsection below.)

While (h) is a finding concerning marks, it may not mean that the average marks of grade 13 students fell in the strike year. The decline in average marks of *applicants* from strike boards could indicate that overall grade 13 marks were lower, or it could indicate that above-average students did not apply and thereby applicants' averages would be lower. In short, the data summarized in (g) and (h) could be interpreted as suggesting that the pattern of *school* dropout associated with the strike extended to the process of *postsecondary transition*--that students from strike boards continued to "drop out" from applying to postsecondary institutions, and of those who did apply, more "dropped out" by not registering.

Nor can these problems of interpretation be resolved from the data on honours graduation and Ontario scholarships.

(i) Neither the Transitions component nor the Achievement component, both of which examined the awarding of Ontario scholarships, was able to detect any change connected with the strike in the ratio of scholarships to grade 13 enrolment. Awards of Ontario scholarships rose in both strike and no-strike boards in the strike year. This convergence in findings suggests that the percentage of grade 13 students with 80+ averages was not affected in the strike year. (Since the impact on marks for postsecondary applicants also occurred below the 80+ average, there is additional support for this finding in the Transitions component's examination of the marks of applicants.)

(j) Both the Achievement component and the Transitions component detected a decline in the awarding of honours graduation diplomas in the strike year. The Transitions component by comparing this decline with province-wide trends suggests that this was not associated with the strike. The decline in honours graduation diplomas occurred province-wide. At the same time, if dropout in grade 13 increased in association with the strike, then this increase ought to show up as a decline in honours graduation ratios, which were calculated on the basis of *pre*-strike enrolments.

In the Attitude component, the data point much less ambiguously to a negative effect on a part of the postsecondary student population who had attended schools which experienced strikes.

(k) Some 21% of the Attitude component sample reported an effect on

"ability and motivation for higher education," and this was overwhelmingly the reporting of a negative effect.

(l) Also 74% of this sample reported the removal of material from the school curricula after the strike; of this 74%, 37% suggested through comments that the effect on them was negative.

(m) Impressions of a negative strike effect on this group are further reinforced by the pattern of student comments. (For a detailed analysis see item (d) in the next subsection below.)

Since the data summarized in point form (a)-(m) above are fragmented and have (because they have different sources) different emphases, it is important to attempt to draw them together into an overview statement. This overview must first provide some summary analysis of the findings and then comment on their meaning relative to student achievement, the focus of this section.

Our general conclusions from the data above are (i) that the strike did have a negative effect on students, and (ii) that this effect was more marked at senior grades, particularly grade 13. We are confident that there was an effect on dropout of this type. Transitions to post-secondary education were also affected, and it may be that this impact on transitions was essentially similar to the impact on school drop-outs. We say "may" here because we cannot tell definitely whether it was marks that were affected or whether students did not apply and attend even though their marks were good enough. As far as marks are concerned, the picture is ambiguous. The actual data we have on school marks themselves suggest that there was no change in the strike year, but these data are drawn from a limited number of schools. Ontario scholarships were unaffected; honours graduation *may* have been affected. The marks of *applicants* to postsecondary institutions in the strike year do seem to have been affected, but this may be a function of non-application and non-attendance and not of an overall impact on the grade 13 marks. (On this point we are inclined to a somewhat weaker inference than that drawn by the Transitions component.) On balance the evidence seems to imply that marks were not affected. The achievement component's limited analysis of marks indicates this, and any other evidence which by inference deals with grade 13 marks (marks of postsecondary applicants; Ontario scholars; honours graduation) *can* be interpreted as

indicative of "dropout" and not marks changes. This is a judgment, however, and it is not something we offer with any degree of certainty.

What, then, is the meaning of these findings for student achievement? As far as the information on dropout is concerned, the move to ideas about achievement is an inference. In one sense, dropout effects are *ipso facto* negative effects on achievement. Students dropped out in the strike year who ordinarily would have finished their year. The fact that the point of maximum impact was grade 13 is in line with the theoretical ideas developed above. It is also important to note that the effects were not confined to the dropout population. Those students who entered postsecondary institutions gave accounts of the ways in which they believed that the strike had affected them which are quite consistent with the dropout patterns. A substantial minority of this postsecondary group believed that the strike had had negative effects on them, just as the school dropouts cited the strike as a primary reason for leaving school. At the same time all of the data on dropout can, as we note in Part Three below, be interpreted as having to do with motivation and not achievement.

The ambiguous findings on marks may, however, mean little as far as achievement is concerned. Given the possibility that their marks were inflated by teachers exactly to protect students against negative effects, we are inclined here to treat students' comments more seriously than their marks. Many of the postsecondary students who completed questionnaires or gave interviews in the Attitude component perceived that something was amiss, and the coincidence of their by-subject perceptions with the theoretical analyses above is probably stronger evidence for a real achievement impact than the by-grade differences in dropout. It is this by-subject analysis that is the focus of the next pages.

Overall, however, it is not possible to conclude that the data summarized in relationship to the proposition above *demonstrate* an *achievement* effect differentiated by grade level. The analysis of differential impact by subject area set out immediately below does, we believe, strengthen this interpretation. Nor in Part Three of this chapter does the discussion of motivation appear to produce as coherent an interpretation. At the same time, the argument that the strikes' effects were primarily achievement effects remains a matter of interpretation.

*Proposition (7b): Strike Impact in "Hard" Subject Areas*

The data which suggest a greater strike impact in "hard" as opposed to "soft" subject areas are drawn from the Attitude and Transitions components. Data from the Transitions component are again the best information available here, since they permit comparisons of the marks of postsecondary applicants from strike boards in the strike year with those of applicants from both no-strike boards and strike boards in no-strike years. These data from the Transitions component are paralleled by the self-reporting of impact made by students in the Attitude component and by patterns of student comments in this study. Data on marks from the Achievement component show no strike effect overall, nor any differential effect by subject, and this study therefore contradicts the findings of the other two component studies.

In point form this evidence is as follows:

(a) The mean of the average marks of strike-board applicants to university in science, engineering, commerce and business, and nursing fell in the strike year 1976 and increased the following year. This pattern contrasted to the pattern of applicants to these programs from no-strike boards, whose marks were highest in the strike year and fell in the subsequent year. For remaining subject areas there were no differences between strike and no-strike boards. For the applicants to "hard" programs, it was not the highest-level students (those whose averages were 80+) who were affected. Rather the percentage of students whose average was in the 70-79 range fell in the strike year, while the percentage scoring averages of 80+ did not show much variation from the pre-strike to the strike year in any program of study. It thus appears to have been the "above average but not excellent" applicants to "hard" programs of study whose marks were most affected by the strike.

(b) There was also a more pronounced effect in transition ratios to university on students enrolled in "academic" schools. While these schools do provide the relevant background courses in math and science, this finding itself does not demonstrate that the strikes' effect was in these subjects.

(c) The Attitude component showed a self-reported negative impact on "ability and motivation" for higher education by more students in "hard" areas than in "soft" areas. In this component, community colleges were also included, and the pattern of more frequent self-reporting of impact

in "hard" subjects repeats in the CAAT sample too. In addition it is worth noting here that the category of students who most frequently (32%) reported such an impact were in technology programs at the CAATs.

It is possible that this category contains a disproportionate number of students who in other years would have been in "hard" programs in university but who "dropped down" because of the strike.

(d) The pattern of student comments from the Attitude component gives further support for an impact on "hard" subjects. The pattern does require elaboration. Of particular note are the statements made by the 288 students who both perceived that material had been removed from the curriculum and claimed that this had a negative effect on them. Their comments focus heavily on mathematics and to a lesser extent on "hard" sciences. They are *strike-specific:* that is, they refer to disruptions in the grade 13 curriculum which are identified as having to do with the strike (coverage of material after the strike at too fast a rate; omission of important parts of the curriculum). By contrast, only a small number of comments on English preparedness are strike-specific. A much larger number of comments identify lack of English preparedness as a general failing of secondary school education. Specifically the respondents suggest that lack of skill in essay writing, grammar, spelling, etc. results from their being given insufficient attention generally in the *curriculum* of high schools, not because the strike disrupted the teaching of them.

(e) The pattern of differential impact on "hard" vs. "soft" subject areas is again, however, *not* demonstrated by the Achievement component's analysis of marks by subject. It is neither evident in the analysis of marks in the City of Toronto board nor in a re-analysis of marks from a sample of eight Metro schools, a re-analysis made after the completion of the report of the Achievement component.

Comments on how these contradictory data might be "explained away" are essentially similar to those set out in item (f) of the previous subsection. Either the samples may not be representative of the much larger number of schools which experienced strikes, or the data can be discounted as involving marks that do not reflect real achievement effects.

Overall, we are inclined to view the data summarized above as indicative of a strike impact on achievement in these "hard" areas. The pattern of comments from the Attitude component is strongly suggestive

of this. If, as we suspect, the change in the distribution of marks in "hard" subjects reported by the Transitions component represented the failure of the less than excellent students to go on to postsecondary education (rather than a lowering of grade 13 marks), the location of the effect in "hard" subjects is still significant and in line with our theoretical ideas. The by-subject impact on applicants' marks, the self-reporting of most frequent impact, and the nature of students' comments all concur to suggest an impact on achievement in the "hard" areas.

If our interpretation of these findings is correct, this discovery of a differentiated impact by subject area is an important one. It is perhaps the most important insight into the potential impact of strikes that this research project has to offer.

*Proposition (8): Impact by Socioeconomic Background*

In the theoretical analyses in section II above, we suggested that any differential impact of a strike by the socioeconomic backgrounds of students would occur in low and not high grades and hence would not be noticeable by the senior high school levels. Information which can be brought to bear on these ideas from within the component studies is limited. None of the secondary information which forms the major part of the data base for two of the component studies refers to student backgrounds. Only the two primary-data surveys (the Attitude component's survey of postsecondary students and the Transitions component's interviews with dropouts) contain the requisite information.

The Attitude component analyses the relationship between self-reported strike impact and "ability and motivation for higher education" and found no relationship between this item and parents' occupation. The Transitions component asked its samples of school dropouts questions about parents' occupation, income, and education. In the analysis of these responses, differential strike effects by parents' socioeconomic status are hinted at. Not only was such a relationship not expected, but the direction of the relationship found reverses what we would have expected given any residual impact of the effects we predicted for lower grades.

The actual findings from the dropout interviews contain some contradictions, though we believe these can be explained away. In th. strike year dropouts with fathers of high occupational status are ov.r-

represented relative to the preceding and following years. So are dropouts who reported fathers with one or more years of postsecondary education. These findings suggest that students from high socioeconomic backgrounds were more likely to drop out during the strike year than in the years either side. Dropouts' report of family income, however, contradicts this: in both the strike and the post-strike years the proportion of students reporting the highest income fell from their overrepresentation in the pre-strike year. We are inclined simply to dismiss this contradiction in the findings. For one reason, many of the teenage respondents would not know with any degree of accuracy what their parents earn, and the figures they report might be no more than a guess. For another reason, while father's occupational status may be a good indicator of father's income, its relation to family income may be much less clear. If we ignore the finding on income, the findings on fathers' education and occupation converge and suggest an overrepresentation of high-socioeconomic-background dropouts in the strike year. How is it to be explained?

Again, an explanation must be pieced together from fragmentary evidence. We know from the Attitude component that postsecondary students gave accounts of friends who found jobs during the strike and did not return to school. These accounts are consistent with a finding from the dropout interviews--students who dropped out in the strike year were more likely to be employed than those who dropped out in the preceding or succeeding year. The greater "employability" of strike-year dropouts is unlikely to have been a function of general labour market conditions--there was no greater abundance of jobs for high school dropouts in that year. A more likely explanation is that the students were in some way more employable. We suspect that the greater employability of dropouts in the strike year is connected with the greater representation of high-socioeconomic-status students among them. High-occupational-status parents often "control" jobs either directly (they are employers) or indirectly (they know employers). They are thus better able to secure jobs for their children, and probably are able too to secure for them better jobs than are available to most high school dropouts. The strike led students to seek jobs during the school year who would not ordinarily have done so. Whether they stayed in the jobs or returned to school after the strike was likely determined by how good the jobs were, and the high-socioeconomic-background students may well have tended to hold better

jobs and therefore to stay out of school more readily than they would have done in an ordinary year. Certainly some of the university students who had had repetitive manual jobs during the strike commented that these work experiences encouraged them to return to school. Others may have had opposite experiences and stayed out of school as a consequence.

All this is, of course, highly speculative, and we are unable to offer any closer comment on this explanation from the studies. The explanation does, however, resolve the inconsistency between the finding from the dropout interviews and the theoretical ideas which led to the suggestion that any strike achievement effects ought not to be social-class-related at senior grade levels. The explanation above suggests that the overrepresentation of high-status students in the dropout population in the strike year is not a function of a negative impact on achievement in this group but a consequence of their job-seeking and job-retaining behaviour, which though related to socioeconomic background is independent of school achievement.

In general, as is implied in the theoretical sections above, an examination of the differential impacts of strikes by the socioeconomic backgrounds of students ought to include some contrast between the ends of the grade ranges, something that clearly cannot be done with strikes that affected senior grades. Any future examination of the effects of primary school strikes might usefully focus on the examination of differential effects by social class.

*Proposition (9): Differential Impact by Ability and Study Habits of Students*

The arguments from which the ideas are derived are those which suggest a more likely impact on students who are below the top in their abilities to absorb complex disciplines at a fast rate. The usable evidence from the component studies is again limited. The most important evidence involves findings from the Transitions component, findings already described above. The university applicants in the average mark range 80+ seem to have been unaffected by the strike. The analysis of average marks suggests that the proportion of strike-affected applicants in the range 70-79 in "hard" subjects was lower. Precisely what this finding means is, as we have noted above, unclear. Beyond the problem of interpreting this as a decline in grade 13 marks or an increase in dropout, it is further unclear what the precise mark-range location of

the impact was. The fact that those in the range 70-79 were under-represented can be interpreted in a variety of ways: for example, (i) an impact on all grade 13 marks below the top such that all marks below 80+ were lowered, or (ii) selective dropout and non-application and non-registration among those whose marks fell in this range, or (iii) a combination of these effects. It does not seem plausible to see the change in the 70-79 category as a lowering of the 70-79 grade 13 marks only. Were this the case, an increase in the percentage of applicants in the next category down ought to have occurred.

Any of these interpretations might plausibly be seen as fitting with the general ideas used to explain this finding, but the links are tenuous. We do not know that any impact occurred specifically because those with poorer study habits and/or those requiring assistance and practice to grasp general principles were handicapped in the face of changes that occurred in teaching in post-strike classrooms. In searching for further evidence on this point from the other component studies, there is little further insight we can gain. The frequency of relevant comments in the Attitude study is too small to be of very much help. Relevant comments which support the line of analysis above were certainly made by responding students, but the qualitative nature of such data and their infrequency preclude our using them as further test of the ideas.

Even though the ideas we attempted to evaluate here are tenuous in relationship to data available in the component studies, they may be informative for teachers able to observe classrooms after any future strikes or interruptions in schooling.

*General Propositions*

The specific predictions of locations of strike impact examined above were derived from the more general ideas set out in section II. The Attitude component does contain in student comments information relevant to the assessment of these more general ideas. Specifically, comments on preparedness in specific subjects--both in relation to the strike and in more general terms--provide clues to the ways in which "hard" and "soft" curriculum organization and teaching can be compared. Similarly, the comments on rates of learning which contrast school pace and university pace are instructive.

The general contrast between comments that focus on mathematics as opposed to those that refer to English has already been described

above. Mathematics students were more likely to locate their university problems in the strike's disruption of the cumulative mathematics sequence by which grade 13 was to prepare them for university. In contrast, deficiencies in English preparedness were seen as a more general interface problem: teaching of the requisite skills in essay writing was seen as generally inadequate in secondary schools. The comments suggest that in "hard" areas the rate of teaching approached some students' maximum capacities. After the strike the pace was "too fast" and material had to be "skipped." In contrast, comments on "soft" areas point out that it makes little difference if, for example, specific literary works are removed from the grade 13 English curriculum.

An additional set of student comments focusses on complaints about "spoon feeding" in high school and lack of preparedness for university workloads, judged to be considerably higher than in high school. Since these comments suggest a slow teaching rate in high school, and contrast sharply with the complaints of students in mathematics who talk about overload or skipping after the strike, it seems likely that these analyses of slowness come from students in "soft" subjects.

## PART THREE: THE NON-ACADEMIC FUNCTIONS OF SCHOOLS

### *I. Introduction*

The analysis in preceding sections of this chapter has focussed on some theoretical ideas concerned with learning, the generation from these general ideas of specific propositions about strike impacts, and the evaluation of these ideas in the light of evidence from the component studies of this research project. Thus, to this point in the chapter we have been concerned with learning and the impact of strikes on learning. While student achievement is in many respects the heart of the matter, clearly this focus does not exhaust the strikes' impact. Not only is it practically difficult to separate achievement from other variables--for example, "motivation"--closely associated with it, but a whole range of other activities also occur in schools.

Schools are not merely places where students go to learn. For most of their members they are also the locus of a whole range of other activities--friendship ties, sports and recreation, career planning, and the like. Not only do students benefit from school in ways that are more extensive than the subjects they study, but parents also structure their lives around their children's schooling.

The potential impact of a cessation of schooling is, then, obviously much broader than its narrow impact on the learning of subjects contained in the curriculum. The findings from the Attitude component of our research in particular reflect this. When students were asked open-ended questions about the strike's impact, they replied with opinions that covered a range of areas in which school had meaning for them.

Four main foci of school activity are examined below. While these categories probably are not exhaustive of all school-related activity, they do cover most of it. First, schools encompass motivational structures. Interest here focusses on in-school patterns of relationships which encourage and motivate students, and the analysis below is of student/teacher relationships. Second are things referred to here as the "housekeeping" activities of schools. Students move within the education system. They choose classes, move between grade levels, and move from schools to postsecondary education or the labour force. In making these decisions they are advised by "housekeepers"--guidance counsellors and teachers. Third, there are the social and recreational activities associated with school, both sports and other formally organized school activities and informal friendship ties which form in school but spill over into outside recreation. Finally, there are what are loosely characterized as the "custodial functions" of schools. Schooling, whether by intention or not, keeps adolescents off the labour market, where they would otherwise likely be unemployed, and out of mischief, for in the words of an old maxim "the devil makes work for idle hands."

## *II. Motivational Structures*

In analysing students' academic performance, it is conventional to separate achievement from motivation. Motivation is then seen as one of a complex of variables which help explain either achievement or the relationship between achievement and, for example, background characteristics such as socioeconomic status. Such analyses often pose a peculiar problem. The problem centres on the fact that variations in some fairly readily measurable characteristic (for example, marks or dropout) are related to a characteristic (motivation) which by virtue of its referring to the internal "psychological" states of the students is much less easily measured. Indeed, since the indices used to tap these states are often responses to printed questionnaires, real questions arise about

the extent to which they can be seen as measuring characteristics which are theoretically independent of achievement, the dependent variable for which motivation is seen as an independent variable.

These problems are compounded here by the absence of good direct data on the strike impact on achievement. Our best information in this area is from the Transitions component, but as we have noted in Part Two of this chapter, these data deal only by inference with achievement. They might also be seen, all or in part, as dealing with motivation. Similarly in the Attitude component, an analysis of motivation must be made largely inferentially through examination primarily of student comments.

Thus, as with the achievement section of this chapter, any success in providing an analysis of motivation must rest on the provision of a coherent and internally consistent framework within which fragmentary findings can be interpreted and disparate pieces of information connected. Paralleling our attempt above to locate the most likely places where strikes would affect achievement, where would effects on motivation be most likely to show up?

Since we have already summarized the major findings of the component studies within a framework of ideas about the learning of school subjects, it is useful to begin the discussion of ideas which use motivation to explain the findings by focussing on the findings themselves. If motivational factors are to be posited as an alternate explanation to the ideas on achievement developed above, then the findings must eventually be fitted within a similar framework of systematic ideas about motivation. It is, we believe, difficult to do this with the degree of coherence that is possible with the ideas on achievement. There is considerable initial plausibility to the idea that the major findings from the component studies are explicable as strike impacts on student motivation. The major consistency involves the information concerning dropouts. Both the strike-related increase in dropout and the disruption in transitions to postsecondary education that the strike students experienced can be seen as students' choices not to continue their schooling. Thus major findings are consistent with a motivational effect on students, and there are sufficient pertinent student comments in the Attitude component to lend some support to this view. The self-reporting of strike impacts on "ability and motivation" can also be seen in this light. Furthermore, the

apparent absence of strike effects on marks, while not providing any evidence one way or the other, suggests that alternative explanations to those which deal with achievement should be examined seriously.

It is in the analysis of the more subtle effects of the strikes--particularly their apparent differential impact by grade level and by subject area--that it becomes more difficult to provide interpretations of the data in terms of motivation. As we noted above, the strikes' impacts appear to be grade-related, with a maximum impact at higher grade levels, particularly grade 13. Grade 13 clearly contains a selected group of students who are relatively highly motivated. The educational orientations of strike dropouts (as the Transitions component notes, dropouts whose leaving was strike-related reported further educational plans more frequently than did dropouts from other years) suggest the retention of this motivation even amongst those affected by the strike. Since, however, motivation probably tends to be higher in senior grades, it is not clear why these should be the hardest hit by a strike. Indeed, we would expect the reverse effect, with the less-selected, lower-motivated students in lower grades responding most negatively to a strike. Of course, it is possible to argue that the higher the level of motivation, the more likely students were to be disillusioned, particularly with their teachers; but if this were the case, we would expect a strike effect on the top students, and the data on Ontario scholarships and marks of postsecondary applicants suggest no such effects.

Instead, the data on marks of postsecondary applicants suggest that any effect was on students below the top (80+) category. There are arguments concerning students' relationships with teachers and the motivational impact of these relationships that can be connected with these findings; but again in the end we are inclined to discount them since they offer only a partial fit with the evidence.

Some students are more dependent than others on within-school activities and relationships for their motivation to perform. Teachers are very familiar with these variations. Some students are highly motivated no matter what. Some do not care at all. A third group consists of those in between. They are slightly less involved, and may show lower levels of academic performance; and if their motivation is to be sustained, they need to establish relationships of trust with their teachers so that they are encouraged to work.

While there are problems in inferring whether or not the strike affected student motivation, the information on disruption in students' relationships with teachers is somewhat more direct. Bearing in mind that the views are retrospective, students in the Attitude component sample had a more positive view toward teachers before than after the strike; and while by the end of the school year their view of teachers had improved again, it was not as positive as it had been before. The pattern of student expression of negative feelings toward teachers provides the most striking single cluster of comments in the responses to open-ended questions. Not only is the preponderance of comments in this area remarkable, but it is also of note that these respondents used questions not obviously designed to tap attitudes to teachers to express such feelings. Thus, for example, the first soliciting of student comments in the Attitude questionnaire asked for further comment on a yes/no answer to the question, "In your opinion did you learn anything during the strike which you would not ordinarily have learned about in school?" The most frequent comment from the 40% who answered "yes" concerned disillusionment with teachers (e.g., "I have discovered that a great many teachers do not have the education of their students at heart").

We might connect this evidence for a disruption of student/teacher relationships with the Transitions component's evidence suggesting changes in postsecondary applicants' marks. The effect on marks is then seen as a motivational effect consequent upon disruptions in student/teacher relations, a disruption whose most severe effect was felt by the students "below the top" who were very dependent on school.

Beyond the pattern of comments and its possible connection to shifts in the distribution of marks, the evidence is mixed. Those who reported lower average marks in the Attitude component reported more impact on ability and motivation, felt less free to talk to teachers outside school, and saw teachers as having made less effort to make up for lost time. Similarly, those who reported most strike impact tended to have more negative views of teachers. In contrast, however, there were no relationships between average marks and other terms used to characterize teachers ("concerned and caring," "helpful," "friendly").

While selected parts of the findings may thus be used to connect changes in relations with teachers with changes in motivation in order to explain changes in mark distributions of strike-affected applicants

to postsecondary education, this process relies on choosing favourable evidence and ignoring other evidence. Neither the grade-related nature of the impact (most effect in grade 13) nor the impact in "hard" subjects is dealt with. For these findings to be explained, the students most motivated by teachers would have to be (i) disproportionately in "hard" subjects and (ii) disproportionately in higher grades. Commonsense knowledge about students in schools suggests that the reverse is likely true in both cases.

Indeed, it is hard to make sense of the pattern of findings in the component studies without recourse to ideas developed and applied in Part Two about the structure of learning and rates of learning through grades and by subject level. Ultimately it is possible to argue that students were "turned off"--a motivational effect--when they realized that their learning was suffering. But this argument only emphasizes the achievement component and makes the discussion of motivation redundant.

At the same time, however, as we are inclined to interpret the major findings as an achievement effect, it is important to emphasize that we arrive at this conclusion via a somewhat speculative route. The ideas on achievement set out in Part Two of this chapter provide a more coherent framework for interpreting the data. The findings themselves do not deal directly with achievement or motivation. They deal with dropout rates, transitions ratios, student attitudes, and aggregate marks. These findings refer *only by inference* to variables like achievement and motivation. The rationale for choosing between what are in effect "accounts" of the findings thus rests as much in the plausibility of the accounts as in the findings themselves. It thus is possible that there is some motivational account of the findings which is equally plausible to our achievement account but which we have not be able to create. In short, failure to explain the data on the strikes' impacts as a motivational effect may be the fault of us, the authors, and may have little to do with the findings themselves.

*III. Housekeeping*

In making decisions about their movements within the curriculum, between levels (both grade levels and institutional levels), and into the labour force, students are advised by guidance counsellors and their teachers. Not only do these professionals give direct advice to students, but they also have access to and know people and procedures associated with the

transitions. They can, for example, provide forms for university application, help students seek expert advice, suggest sources of printed information, or place students in contact with potential employers.

There is some evidence for the high school dropouts that consultation with school personnel was less frequent in the strike year. The dropouts who left in the year of the strike and who had *not* returned to school by the time they were interviewed were less likely to have consulted school personnel than their counterparts who dropped out in pre- and post-strike years. For the group who returned to school after dropping out, the strike made little difference in their propensity to consult school personnel. As in previous dropout studies, the evidence shows that this group simply did not consult school authorities in any year and that the strike made little difference.

Some effect in the school dropout population is hardly surprising. During the strike teachers and guidance personnel were not available for consultation. A more interesting question thus concerns the university transitions.

Here there are two potential impacts. First, the mechanics of the distribution of forms and assisting students in completing them may have been affected. Second, the encouragement which is an extension of guidance activities may not have been created. Students applying for postsecondary education do so in a milieu in which their peers are also busily completing applications. It seems likely that the atmosphere created by the dual influence of advisers and peers encourages the completion of applications by students who might not otherwise apply.

The important question to be answered in this section, then, concerns whether or not guidance activities and the "applying milieu" were disrupted by the strike and, if so, whether there are discernible effects in the data from this disruption.

First, it is of note that a portion of the data on transitions to postsecondary education might be viewed as consequent upon a breakdown in guidance. In particular there is evidence that the grade 13/university transition was adversely affected. Further, grades 12 and 13 were the primary locations of a strike-related increase in dropout. Both of these findings might be seen as saying the same thing. Students dropped out of education as it became apparent that they had failed in fulfilling procedures associated with making the transition to postsecondary education or because the usual support from teachers and peers was lacking.

At the same time, there are several pieces of data that do not fit with this interpretation. Not only was there an apparently negative effect on the ratio of university applicants to grade 13 enrolment for strike boards, but the ratio of university applicants to university enrolments was also affected. In short, not only did fewer students from strike boards apply to postsecondary institutions, but fewer of those who applied ultimately attended. This suggests an effect which was more extensive than an effect on the application process alone.

Similarly, there is no suggestion from the Attitude component of the research that housekeeping functions were a location of strike impact. There are comments in the answers to open-ended questions which relate to guidance, but these comments analyse guidance as one of the school functions that need general improvement. There are no comments on any strike-specific difficulty in obtaining or completing application forms. Given the breadth of student comments and the intensity of the attitudes, it seems highly unlikely that students would have omitted mention of something as important as this had it occurred. In contrast, there is a wide range of evidence in the Attitude component which is suggestive of the alternative explanation for these findings--a strike impact on achievement (see Part Two, section IV, above).

Caution must be exercised here because of the fragmentary nature of the data. There is no direct information on the strike's impact on housekeeping functions, and a statement which asserts that these were not affected is in large part an inference from the absence of student comments. A definitive conclusion that these housekeeping functions were not disrupted is not possible. At the same time, given the absence of comment, any negative effects of the strikes seem unlikely to have been consequent upon any disruption in schools' housekeeping functions. Possible effects through a disruption of ordinary peer pressure to apply to university are less easy to discount. Even if this peer milieu had been different in the strike year, students would have lacked any comparative experiential basis for comment. The absence of comments here may thus mean nothing at all.

*IV. Social Activities*

Schools are the loci of two sets of social and recreational activities for students: informal friendship ties with peers, and formally organized recreational programs such as sports. Not only did the strike directly

affect both sets of activities by closing the locations where they most take place, but sports programs were not resumed in the portion of the school year remaining after the strike.

The amount of information in this area from within the component studies is severely limited. Only the Attitude component has relevant data. To a direct question on whether students missed school during the strike, 44% of the sample reported missing being at school; elaborations of their responses in their own words suggested that worry about lost instructional time was their main focus, with missing sports and social atmosphere a second concern mentioned by a small number of students.

There is thus insufficient data in this area for any extended analysis.

*V. Custodial Functions*

Information on impacts on this area are similarly sparse. Comments are limited to the two primary-data studies--the Attitude component and the dropout interviews of the Transitions component. The available data focus exclusively on employment, thus offering comment on changes the strike created in the withholding of students from the labour force. The Attitude component suggests that, while most students worked little, one-quarter of the sample worked over eighteen hours a week (i.e., more than a 50% work week). There is no direct comparison with students' pre-strike work experiences, and some of those who worked were likely continuing part-time or weekend jobs that they held before the strike. Some students, however, clearly worked only because the strike gave them the time to do so, and student comments indicate this connection. Several of those who had worked full-time noted that the work had negative aspects that encouraged them to go back to and go on in school.

These comments, of course, are from an "extreme" group, the students who not only stayed in school after the strike but also went on to some form of higher education. The other "extreme" is represented by the dropout interview sample of the Transitions component. As we have noted elsewhere, dropouts in the strike year appear to have been better able to find work than their counterparts in pre- or post-strike years. In short, strike dropouts seem to have been somewhat more employable. We have speculated elsewhere on the possibility that the higher socioeconomic backgrounds of the strike-year dropouts gave them better access to jobs via parents' contacts. Another possibility is that

the strike dropouts themselves were in some way more attractive to employers or showed more initiative in finding work. Whatever the explanation, it seems that the strike did encourage a small number of students to enter the labour force who ordinarily would not have done so.

An interesting "aside" on the convergence between these two studies is offered by a comparison of student comments from the Attitude component with the findings from dropout interviews. There were in the Attitude component a number of third-person accounts of students who started at jobs during the strike and did not return to school. The accounts described experiences of "friends" of the respondents. The correspondence between these accounts suggests that the students made relatively accurate, if after-the-fact, accounts of events that occurred during the strike.

Beyond these limited effects in the relations between schools and the labour market during the strike, the limited nature of the component studies' data makes any more extended comments on other custodial functions of schools impossible. Whether or not the devil made work for idle hands during the strike is not something we can tell.

# 4 Summary and Implications

The chapters preceding this one have been concerned with the description, overview, and analysis of the component research projects. The objective of this chapter is to ask a question which can be only partially answered from the research itself: "What do the findings say that might be of value in forming a response to any future strikes?" Answers to the question make assumptions beyond the research. We assume here that strikes may recur, and that it is important to prevent their having a negative effect on students, particularly in areas which are consequential for their futures. Specifically this means using evidence which indicates strike impacts on achievement and dropout and asking, "How might such effects be mitigated after some future secondary school strike?" Implicitly, too, this involves generalizing beyond the strikes included in the research to other yet-to-occur strikes.

An analysis of implications thus makes assumptions which lie outside the research we have done. If it is to be systematic and comprehensive, it also requires that certain features of strikes not examined in this research project be understood in more detail. First, the relationship between instructional time and learning needs to be more thoroughly investigated. Understanding this relationship would need a broad research effort of which research on strikes would form only a small part. Its result, however, would be an increase in the understanding of how strikes are different from other breaks in instructional time (prolonged illness; school vacations). Second, it is important to know how teachers respond to strikes. How are their self-images and their conceptions of the job they do affected by strikes, and, in turn, how do these changes affect students? As we noted above, we were unable to collect information in this area.

Third, it is crucial to find out what happens in classrooms after strikes. In particular, how does the behaviour of teachers change? How do they cope with the problem of telescoping curriculum into shorter periods? Again this is an area where we have fragmentary information which comes only from students and not from the teachers themselves.

Of these three features of strikes, most attention has been given to the first--the relationship between achievement and instructional time. Here we argued that the relationship is insufficiently well understood for us to be able to generate precise statements about the effects of breaks in instructional time. In lieu of this analysis, we opted for arguments which indicate the most likely grade-level and subject-area locations of effects. This speculation helped explain the locations of what appear to be maximum effects--"hard" subjects (math and science) in senior grades (12, 13). It also pointed to areas in which we need to re-examine some of the data.

The impossibility of providing precise quantitative statements in this area precludes formulating an answer to the most important policy question that has arisen in relationship to Ontario teachers' strikes. This question concerns the point at which strikes jeopardize students' academic years, and the Education Relations Commission is charged with responding to it during prolonged strikes. The research summarized in this report cannot provide an answer to this question. Nor is it likely that more sophisticated research on strikes could ever do so. An answer would require a very precise and sophisticated understanding of the relationship between achievement and instructional time. Such an understanding is unlikely to be achieved solely by research on strikes, and may well involve issues too complex for any meaningful answer to be formulated.

Distinctions between strikes and other breaks in instructional time have not been examined in this report, again primarily because the data in the component research projects offer little specific comment. Differences are, however, obvious. Strikes contrast sharply with breaks when single or small numbers of students or teachers are absent. If teachers are absent, they are usually replaced. If students are absent for long periods, individualized attention is possible. Strikes are more like vacations in that all teachers and all students are absent. But curriculum is planned around vacations and not around strikes. Strikes thus occur in the middle of sequenced learning, not at its beginning or

end, and they affect the total amounts of time available for teaching. In addition strikes are controversial and generate emotions. Some of these emotions are recorded in our data. Student attitudes emerge forcefully in the comments of the Attitude component, and from students we have some indirect information on parent attitudes.

About teachers' attitudes the component research says little. The Attitude component contains some data which gauge student perceptions of teachers and changes in teaching after the strike, but to portray these as an analysis of teacher attitudes would be entirely misleading. It is a major weakness of this study that what is probably in both the long run and the short run the most critical aspect of the strikes--their effect on teacher morale and teacher attitudes toward their profession--must go unreported.

The continuing lack of information in this area is heightened for us by the fragmentary picture we gained in the informal discussions we had with teachers both at various stages of the research and in our other contacts with them. Common themes emerged from these contacts. Many teachers were surprised at the negative reaction toward them that surfaced during the strike. Some responded with hurt, some with outrage. Some gave public expression to their feelings, others voiced opinions only to other teachers. Anger was often directed at what teachers universally regarded as hostile media. While the form of the reaction varied, the content was frequently shared.

Those teachers who have spent many years in the profession regard teaching as a "calling." The high self-esteem, the professionalism associated with this view of teaching as public service, has historically compensated for low salaries. Ironically, a portion of the public agreed with this assessment of the teachers' profession and thought teachers should be above the tactics of collective bargaining. Teachers should not go on strike like postal workers. Thus their sharing of the view of teachers as professionals resulted in condemnation, just as did the views of that portion of the public who simply thought that teachers were asking for more money than they were worth and backed their opinions with pointed criticism.

Teachers' perceptions of the absence of the respect they felt was their due were further heightened by the political orientation of some board members. Many long-service teachers had not adapted to the realities of the new boards, which, as well as governing school systems, serve as

political arenas for trustees. Where trustees in the old local boards had fairly uniformly supported teachers, some of the new trustees suddenly appeared to teachers as a primary source of criticism.

In contrast to teachers with many years of experience, the younger and often more militant members of the profession will not regard our description of "surprise" as either flattering or accurate. For them teaching is a job. They wanted more money and better working conditions, and collective bargaining is simply a routine way of achieving those objectives. While the consequences of strikes were, for the second group of teachers, understood in advance, their reaction to criticism seemed nevertheless to be intense.

Paradoxically the differing teacher orientations reinforced one another, and the end result was well summarized by a teacher negotiator in Kirkland Lake: "If they no longer respect us and value our services we're at least going to make sure we're well paid for all the crap we have to take."

Again from our informal contacts with teachers, it seems that they returned after the strike with different attitudes toward their profession. To many, teaching had become a job. The trappings of service had disappeared, and the willingness of teachers to devote energies to non-essential areas of teaching--extracurricular or cultural enrichment activities--had decreased.

It is difficult either to gauge how prevalent these attitudes were (and are) or to determine their short- and long-run effects, if the attitudes were indeed widespread. Any decision about how to respond to a strike after it has occurred is essentially a decision about the most efficient use of scarce resources, the prime resource being classroom time. It is difficult to imagine that very much effect on the post-strike allocation of classroom time was possible. Teachers likely established core learning in their subjects, telescoped and reorganized curriculum to achieve these high-priority objectives, cut down on in-school supervised practice time, eliminated extracurricular and enrichment activities, and gave individual attention to those students who sought it. It is difficult to imagine that things occurred very differently. The pressure of time dictated the reorganization. We do know that a core of 15-20% of the students in the Attitude component reported that their respect for teachers had been lowered by the strike. When they returned to school, students were probably dependent on teachers for making up work, and it

seems likely that any conflict resulting from the strike would have taken the form of an uneasy truce rather than unproductive warfare.

Given our relative ignorance regarding the incidence and the exact nature of teacher attitudes, the long-term effects of a possible decline in teacher morale are still more speculative. One view, expressed by those who have seen the results of a more militant teacher group in Quebec, suggests that the tendency to regard teaching as a job, not a valued service, results in better instruction at the classroom level. Others think that the general devaluing of teaching in the eyes of teachers is very unfortunate. In the long run students will be deprived of many of the unseen--and, in teachers' eyes, unappreciated--extra duties that teachers have willingly performed.

Even within the framework of the scarce time available after a strike, attempts to remedy negative impacts might plausibly counter negative effects summarized in this research. First, there are good reasons for believing that the duration of schooling in many subject areas can be decreased. Duration of schooling is in part explained by the large number of responsibilities that schools now have over and above their academic objectives. Many activities which were once located in the home or in the marketplace now take place in schools. Cutbacks in social service (Children's Aid, social work) and de-institutionalization policies in areas such as juvenile delinquency and mental retardation have increased the burden on schools without increasing their resources. Teachers often view these added responsibilities as problematic. A focus on primary academic objectives tends to reduce the in-school attention to these areas. At the same time, however, extra-school institutions such as those for the retarded and for juvenile delinquents are no longer adapted to coping with large numbers of adolescents, a fact which has been one source of public dismay over past teachers' strikes.

Second, there are suggestions that can be constructed from within this research project. After a strike, schools might, for example, utilize flexible programming to allow the allocation of more teacher resources to grades 12 and 13. This could be accomplished by cutting back on certain classes in lower grades and substituting practice time in larger groups. Thus instruction in grades 12 and 13 could be successfully telescoped into the shorter time available, while in grades 9, 10, and 11 the telescoping could be spread over a longer period. While such allocation of additional resources appears to be most needed in "hard" areas, where instruction is

more intensive and telescoping more difficult, the additional input in "soft" subjects might be focussed on the intensive teaching of complex skills such as expository writing. Similar kinds of additional help might also be made available in the postsecondary institutions for those students who go on.

Students in senior grade levels are most indicated as the focus of remedial action. While the strikes we believe had other identifiable impacts beyond this one--for example on dropout and attitudes to teachers--the kind of remedy that can be offered here is less readily identifiable. Because our data are partial, we are less able to generate understandings of how and why these effects took place. Hence, remedies are less obvious.

There are, however, we believe, data and analyses in this report and in the three component studies which provide useful guidelines for teachers. Teachers themselves are able to observe classrooms directly in a way in which social science researchers cannot. While their observations may not be readily generalizable (they are restricted to limited numbers of classroom situations) some of the analyses in this report may well enable them to focus their observations more productively in areas where they sense that there has been an impact. Thus, for example, we suggested above that the strikes studied may have had a more marked impact on students who are below the top achievement levels. Teachers, we believe, can from their own personal knowledge identify such students in a way in which research cannot. They may also from their experiences with previous post-strike classrooms be able to supply to their own satisfaction the information which is missing in our analysis. If so, this report may provide individual teachers with clues which allow them to allocate their own within-class time after a strike. For example, they may wish to give extra attention to those students who are more dependent on in-school experiences. Similarly, they may wish to pay particular attention to encouraging those students who need additional practice time to set aside the necessary extra hours for homework.

Thus, permanent negative effects of future strikes on the academic careers of students may well be to an extent avoidable, and it is our view that teachers are generally willing to help prevent them. For teachers, the strikes are not by intention directed against students' academic achievement. The immediate impacts which strikes have through the inability of society to cope with out-of-school students, and their non-academic effects on students, are sufficient to make strikes a powerful weapon.

Indeed, teachers would probably universally deplore negative effects in academic areas. In short, we do not believe that future teacher cooperation in minimizing any negative impact of strikes on student achievement is antithetical to teachers' collective bargaining interests.